THE BUILDER

A JOURNAL FOR THE ARCHITECT & CONSTRUCTOR

VOLUME CXXI. No. 4104. *Seventy-ninth Year.*

FRIDAY, SEPTEMBER 30, 1921.
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THE BUILDER

A JOURNAL FOR THE ARCHITECT AND CONSTRUCTOR.

WITH WHICH IS INCORPORATED THE "BRITISH ARCHITECT."

VOL. CXXI.—No. 4104. SEPTEMBER 30, 1921.

THE COST OF HOUSE BUILDING.

WE have previously made some general observations on the Departmental Committee's report on the high cost of working-class dwellings, and the suggestions of the Committee, though they provide no talisman, contain a good deal of matter for reflection and further comment. Probably most of us have our own ideas as to the reason for high costs. This report sets out the various causes as assessed by this Committee, and on the whole must be regarded as a fair and impartial statement of the position. It appears that about 90,000 houses below £20 rateable value were erected in 1900, 105,000 in 1907, but only 44,000 a year subsequently to 1914. Low profits about 1908, the Finance Act of 1909–10, and the war are admitted as reasons for the extinction of the speculative builder. The outlying situation of many building schemes is cited as a cause of greater cost, but the magnitude of these schemes and assurance of a return is not suggested as a set-off to expenses of transport. The recommendations of the Tudor Walters' Committee as to the size of rooms and general nature of the houses is referred to as making pre-war prices of small houses not comparable.

Referring to the Housing Act of 1919 the following important statement occurs: "An immediate demand for a very large number of houses was thereby assured, whilst at the same time the local authorities, from whom the demand was to come, were freed from all but a negligible direct financial responsibility." We are very glad to have this fact nailed down, and hope it will not be forgotten in any future Government outbreaks into commercial spheres. The Committee regards this sudden demand and policy as having "a considerable effect" upon building costs. The absence of direct incentive to econom-, the demand for different and better houses than before provided for working people, the rate of provision aimed at, the low ebb of supplies and the great demand for labour, are given as obvious elements in the cost of commitments amounting to 160 million pounds by some 1,250 different local authorities. We read into these few paragraphs what amounts to a condemnation of the Government's housing scheme, not perhaps as a Utopian idea but most decidedly as a business undertaking; and not only so, but since these considerations were bound to result in ultimate stagnation the failure must really include the main issue—the provision of houses apart from the business aspects of the case. The pressure placed on local authorities compelled them to make contracts with builders on terms which threw the whole onus upon the building owner—the taxpayer in this case. Increased prices affected neither the builder, nor the local authority after the penny rate liability. This is the cost-plus-profit system, and we are glad to see what amounts to an unqualified condemnation of this basis of payment, against which we have consistently declaimed since its inception.

"We would recommend that some amendment of general policy should be made as early as possible," says the report. The Committee recommends the limitation of houses under the present scheme and only a contribution towards the deficit by the State in any further provision decided upon. As regards land, the terms of purchase arranged are considered satisfactory. Length of frontage comes in for some criticism as regards cost, and the semi-detached house, it is suggested, should be built in limited numbers only with reserved sites suitable for shops. It is recommended that the lay-out of schemes already approved should be reviewed with a view to economy. This rather suggests the old terrace with a shop at the corner, and though some economy is possible in the manner suggested too drastic an interpretation will necessitate a reversion to back roads. A novel suggestion is made in reference to bills of quantities—separate pricing of labour and materials. We do not feel sure that this would be a wise departure, but have often felt that for simple buildings some decrease in elaboration might be sought with a reduction in the cost. The contention is, of course, that every mitre must be taken off and labour reduced to a minimum, but there is no doubt that the very formidable bill which results often has a tendency to make the work appear more elaborate than is really intended.

The Committee encourages the resumption of lump-sum tendering. We have often pointed out that this honoured method must and would return. It is wholly unfair to put the risk of every change in conditions upon the building owner, and the only way of doing business is to make a definite charge and have done with it. We think it is not too much to say that the cost-plus-profit system—the word "cost" being none too clearly defined—has had more to do with the cessation of building work than anything else, both by its direct ambiguity as to final cost and its indirect "anti-hustling" results.

The Committee's attention has been specially directed to the question of output of labour, estimated at 20 to 50 per cent. less than in 1914. This, of course, is the main cause of high prices. We do not mean only output on building works, but output generally involving the price of all materials. There is an unfortunate tendency in some people to exploit a difficult situation, to take a personal advantage at the expense of the rest of a community so impersonal that there is little remorse in such action. These methods bring their own "reward" sooner or later. A very long time ago we told our readers that we were heading for trade stagnation. Not satisfied with golden eggs, the goose has been so worried for more, that now it is much too ill to lay anything and the only chance is to put all idea of immediate gains aside and by patient and hard "nursing" restore the bird to its pristine powers of production. There is any amount of work, and there is really a good deal of capital, but not for speculative and uncertain uses. The demand has been practically killed, and hence the methods of supply will have to come to heel.

One other matter we must comment upon—the possibility of piece-work raised by the Committee. We know the difficulties and trade union objections; nevertheless, to be paid for what one does is the key and secret of progress and incentive to good work, and we sincerely hope that an effort will be made to introduce even if only partially some method of payment by results. The building trade presents exceptional difficulties, but many great minds are associated with it. If the *ad hoc* Committee representing the public and the industry is formed as suggested it should consider this matter carefully.

Comparative curves are given of the cost of living and of the position in America. These curves are very interesting and show how the cost of building overran the cost of living at the beginning of 1920, and how the discrepancy increased up to the middle of that year, when building prices reached their maximum.

The recommendations contained in the report are numerous but they all tend to emphasise the importance of a return to the normal pre-war state of the industry. One salient fact seems to us to emerge, namely, that we cannot alter the laws of supply and demand by appeals to patriotism or anything else. Supply will always take advantage of demand if it can, hence it behoves demand to adopt, we will not say a ca' canny policy, but to proceed cautiously in order to keep supply reasonably in hand. This may sound rather brutal reasoning for the homeless, but the alternative of being faced with impossibilities is worse than facing facts.

Finally, the report contains some very valuable diagrams showing the cost of labour and materials at different dates.

NOTES.

Another Housing Programme?

FREQUENT references have appeared in the Press recently suggesting that the Government proposes to initiate a new housing programme in connection with its measures for the relief of unemployment, and it is stated that this subject is now being considered by the Prime Minister. "Houses are wanted everywhere—why not build them?" he is reported as having said in an interview. "Why not plan garden cities on a great scale? By doing that you would find work for large numbers of unemployed at once in the most practical manner, and the money spent would not be wasted. In addition to the work of building there would be so many other opportunities for labour—the making of roads, the provision of transport facilities, electric lighting, and so on." These words recall the eloquent plea for houses made after the Armistice, and it looks as though we shall soon be hearing plausible demands for "garden cities for heroes." The unemployed question is a serious one, and must be wisely and sympathetically taken in hand, but while the Government may well allocate money (if it can be found) for carrying out work of the kind indicated under the direction of local authorities, we hope we are not to have thrust upon us another Government scheme differing from its housing scheme in name only.

London Development and the County Hall.

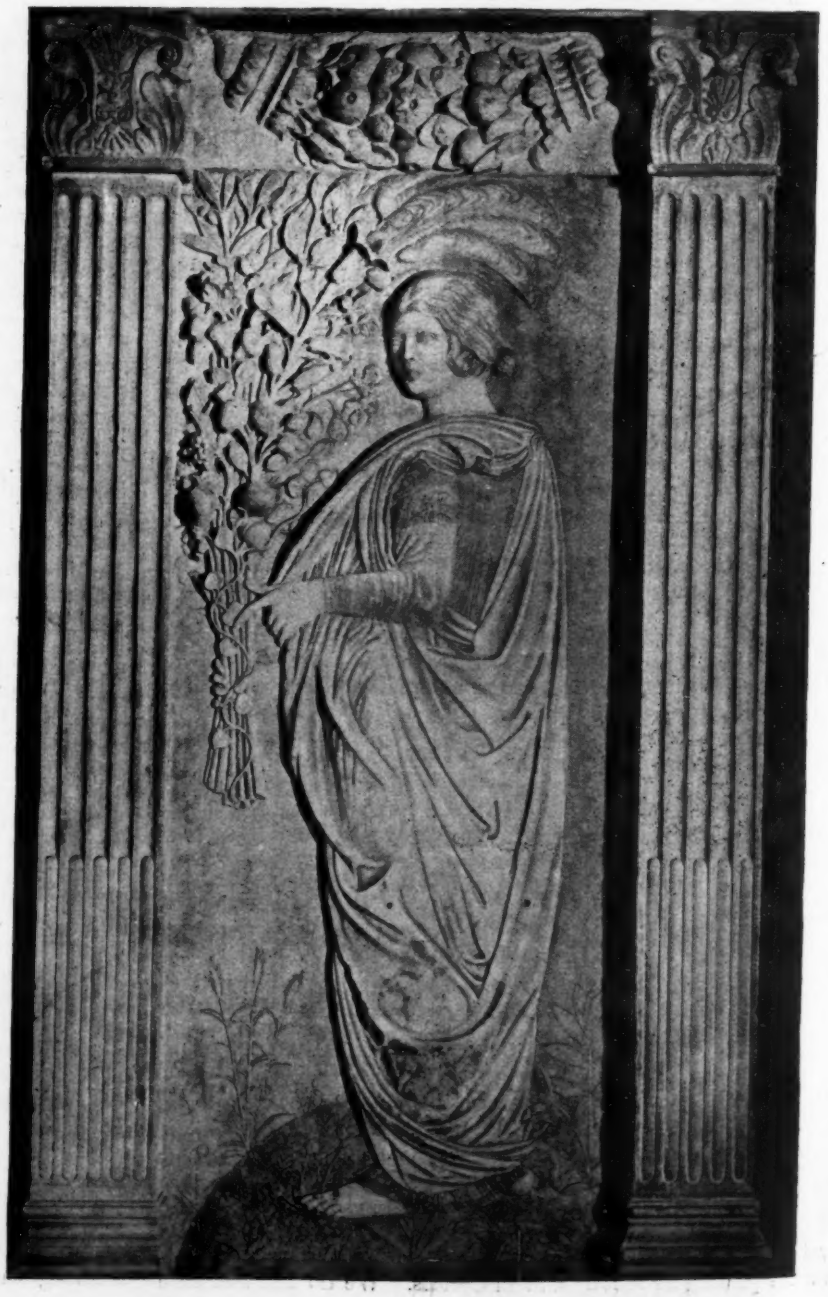
THE vital need for some effort like that put forth by the London Society on behalf of the development of London is made increasingly manifest every day. Now that the new County Hall buildings are nearing their finished outline the public will be impressed with their size and dignity of effect, and it must be admitted that they do seem to take their place as a linking up of the south side of the river with the fine range of the Houses of Parliament on the north bank. But if anyone will look at the buildings along the direct line of the river front they will find that this cuts across the line of Waterloo Bridge very unpleasantly. Of course, this would have been obviated if the Council had planned the front of the new buildings at a right angle to a line bisecting the angle formed by Waterloo and Westminster bridges. Were the practical difficulties great enough to prevent this? Moreover, it is readily seen that a bottle-neck has been created between the County Hall and St. Thomas's Hospital, which will be rather awkward some day when we wish to have two central lines of quick traffic at, say, forty miles an hour in and out of London over Westminster Bridge. Yet who can doubt where the lines of progressive development in traffic are leading us?

Parliament Buildings of Northern Ireland.

THE Ulster Society of Architects has forwarded the following important letter to the Right Hon. Sir James Craig, M.P. (Prime Minister of Northern Ireland): "Sir,—It having come to the knowledge of the Ulster Society of Architects that an application has been made by the British Treasury to the Royal Institute of British Architects for advice as to the design for the proposed Parliament Buildings for Northern Ireland, and that the Council of the Institute has advised that a select competition be promoted, limited to six well-known architects, presumably selected from the personnel of that body, the Council, having the matter under consideration, resolved as follows: 'As the buildings for the Parliament of Northern Ireland are, perhaps, the most important of a national character that have been proposed in recent years, the limitation of such a competition is highly undesirable, and not in accordance with precedent. It is held that it is essential that, in a matter of such importance, every architect in the United Kingdom should have an equal opportunity to compete, and that the result is more likely to obtain the best possible design.'" As this is a matter of importance to the profession, the Ulster Society has sent copies of the letter to the various professional bodies.

Architects' and Surveyors' Assistants

IT says much for the vitality of the Architects' and Surveyors' Assistants' Professional Union that it is carrying on its useful work during the present difficult times, and the report of the second National Convention of Delegates at Leicester, which we give on p. 407, indicates a determination to carry out its not unreasonable programme, though, at the same time, it shows a recognition of the



"Botany": from the third Chapel, Cathedral of Rimini (15th Century).

fact that reasonable demands cannot be effectively made while professions are overcrowded and more and more men are being turned out to compete with those already in practice. The resolutions which were adopted are much to the point, and we hope they will not be without effect.

"The Poor Man's Path."

THE letter under this title which appeared recently in a contemporary bears very strongly on what we described in a recent Note as the abuse of the country roads by the motorist. The matter has assumed even greater and more immediate importance from the point of view of the general welfare of the users of country roads by the proposals now made by the Automobile Association, which claims "an intimate knowledge of the whole country." The one fact most demonstrable is that the motorist never becomes familiar with the country at all in the intimate sense in which the pedestrian may claim to know it, and the pedestrian is in process of being driven off the roads altogether. If the motor interest now wishes to use up the green verges of our country roads in order to widen them, there will be taken from the country-side one of its greatest charms. To thousands of people who are not motorists the beauty of these country roads is very dear, and this enjoyment is not one to be much missed by motorists travelling at twenty-five miles an hour. Such a form of locomotion permits of no such intimate pleasure. Again, to quote from the letter to which we have referred, "the road-side green or 'flash' is the poor man's path, soft and easy to the foot and costs nothing to the country." No attempt to increase the inconvenience or curtail the pleasure of the road-side should be permitted; on the contrary, there is a long over-due claim that the public should have returned to them the hundreds of acres of road-side which have been closed in already.

The "Old" Church in Delft.

IT is with great regret that we hear that the "old" church at Delft has suffered badly from fire, said to be due to careless plumbers. This accident perhaps strikes one more than usually as it is practically the only church of importance in Holland against which a multitude of cottages and workshops have not been built. The "old" church, although not so rich as the "new" church in the market square, is a remarkably fine one. The brick tower with overhanging conically-roofed angle turrets leans considerably, and has attached to the west side what must have been an extremely richly-carved parvis chamber. Internally, as in most Dutch churches, everything is whitewashed—wooden vault, stone piers and walling—the caps and bases alone being in natural stone. The effect is remarkably fine, but about 1800 the arch stones in this church were "marbled" in imitation of a brown breccia, the alternate long and short voussoirs being distinctly marked. The stones were much worn before painting and the effect can hardly be called happy, although it cannot easily be forgotten. As is natural with clear glass and whitewashed walls the church is much overlighted, and to remedy this the fine stone tracery to the north transept and clerestory has been filled in with brick panels, but even in their present condition these arrest the eye externally. The oak pulpit is a particularly fine example of perspective work.

Memorials in the "Old" Church.

THE tombs here, except that of Admiral Van Tromp, are not more remarkable than in most Dutch churches. They follow the usual Dutch pattern of a violent black and white contrast in marble, which strikes a most impressive and characteristic note full of the majestic awe of death. That to Van Tromp (1598–1653) is on the ill-fated north side, and was designed by Jacob van Lampen, the architect to the Palace at Amsterdam, with sculpture by Ramburt Verhuls and Breda, and a remarkable bas-relief of a naval battle by William de Keyser. The whole composition, with its violent black and white contrasts and contrasts of full modelling and low relief, is remarkably fine. The monument of honour in this church, viz., that in the centre of the apse where the high altar originally stood, is a similar composition by Peter de Keyser to Admiral Peter Hien (1587–1629), who captured the Spanish silver fleet. The nave has been adapted as a preaching hall for Lutheran services, a mutilation that is accepted as a matter of course after visiting a few Dutch churches.

Building in Regent Street.

SOME indication of the character and extent of the buildings now being erected in London is afforded by the illustrations we give in the present issue of new business premises which are being constructed in Regent-street. For some years before the war, the erection of many imposing blocks of buildings had done much to change the appearance of the principal streets of London and other cities and towns of the country, and, though this work of rebuilding was perforce stopped shortly after the outbreak of hostilities, there are many indications that it is now being continued. We know, of course, that high costs and other considerations have delayed—and, in some cases, stopped altogether—the erection of many buildings which would otherwise have been proceeded with, but that there is considerable activity in the building industry is shown by the work which is now being carried out in London and elsewhere.

Lady's Work-Table in Lacquer.

The Retirement of Mr. G. Northover.

MEMBERS of the R.I.B.A. will read with pleasure the graceful and characteristic words of the President, Mr. Paul Waterhouse, announcing the retirement of Mr. George Northover, the Editor of the *Journal*, after a connection with the Institute of over twenty-eight years. Mr. Northover joined the R.I.B.A. with considerable experience in editorial work, and it is within the knowledge of all who are familiar with the publications of the Institute that he has done much to maintain the literary value of the *Journal* and add to its general usefulness to members. Even with his sound literary judgment and a love for verification and fact, it was no slight achievement to produce almost unaided each succeeding issue, especially during the war period, when practically the entire burden of secretaryship fell upon him. Only those who have had actual experience of editing can fully appreciate the nature of the responsible work which Mr. Northover has carried out so successfully for so many years. It will be the hope of all who know him that he may long enjoy his well-earned rest, but there will be feelings of regret that one who has served the Institute so zealously is now relinquishing those duties in the carrying out of which he has earned the respect of all who know the *Journal*.

GENERAL NEWS.

Professional Announcement.

Mr. S. B. Russell, F.R.I.B.A., is resigning his appointment as Chief Architect of the Housing Department of the Ministry of Health, and will resume private practice at 10, Grays Inn-square, London, W.C.1. (Telephone: Chancery 7316.)

R 38 Memorial.

The Air Council has approved of a fund being opened in the Royal Air Force to provide a memorial in the Western Cemetery at Hull over the grave of the officers and men who lost their lives on service in His Majesty's airship R 38.

The Horse Guards' Parade.

We regret that in our remarks on the Horse Guards' Parade last week we referred to the other scheme in which Mr. Speaight had taken part as the Hyde Park Corner improvement, whereas it should have been the Marble Arch improvement.

The Mall Approach.

The Minister of Transport has made an order extending to August 7, 1922, the time in which the London County Council may exercise its powers for the compulsory purchase of lands under the Mall Approach (Improvement) Act, 1914, and for executing the improvements specified in Section 3 of that measure.

The Town-planning Institute.

The Town-planning Institute is to hold a conference at Cambridge, from October 6 to 10. The programme includes addresses and discussions on town-planning, on the function and future of the Institute, and on the town-planning of Cambridge. On October 9 the members will visit Ely by chars-à-bancs.

R.A. Winter Exhibitions.

The Royal Academy Winter Exhibition, to be held in January and February next, will consist of select works by recently deceased members of the Royal Academy. In January and February, 1923, it is proposed to hold an exhibition of decorative painting and sculpture, with certain other forms of decorative art.

The History of Art Congress.

The International History of Art Congress was opened in Paris on Monday last by M. Paul Léon (Director of Fine Arts), who welcomed delegates representing some thirty countries, including Sir Hercules Read; Mr. Campbell Dodgson and Mr. Laurence Binyon (of the British Museum); Mr. Collins Baker (of the National Gallery); and Mr. R. C. Witt.

Housing Progress in Scotland.

The following figures show the progress of State-aided housing schemes in Scotland up to September 15: Permanent houses completed, 2,683; temporary houses completed, 604; reconstructed houses, 67; houses built under the private subsidy schemes, 854; total, 4,208. There are, in addition, 13,774 houses under construction, of which 2,026 are being built by private persons with the aid of the Government subsidy. The total amount paid out by the Scottish Board of Health in respect of the 854 houses completed under the private subsidy schemes is £206,853 6s. 8d.

Books on Architecture.

For several years the Norwich Public Library has co-operated with the Norwich University Extension Society by publishing lists of books on the subjects of the courses of lectures. The new number (October-December) of the "Readers' Guide" (post free, 3d.), just issued by the Public Library, contains a comprehensive annotated and classified list of books on "English Architecture up to 1550," the subject of the course of weekly lectures which are being given by Dr. D. H. S. Cranage, F.S.A., at the Norwich Castle Museum. The list of books should be of service to those attending Dr. Cranage's lectures, and to all who wish to study the early history of English architecture. The guide also contains the usual classified and annotated list of books recently added to the Library.

Home-grown Timber.

Speaking before the members of the Royal English Arboricultural Society last week, the Earl of Selborne (President) said it would be a calamity if the forestry policy of the Government were to be scrapped. They were not enamoured of Government control, but if there was one industry in which State enterprise was justifiable and necessary, it was in the industry of forestry, because forestry, to be successful, must be carried on continuously for a period far exceeding that of one human life.

At the annual meeting of the Society, Lord Lovat (Chairman of the Forestry Commission), speaking on the proposed statistical survey of the woodlands of the country, said their experience was that the amount of destruction that went on during the war, not only of mature but of immature wood, was very much greater than was generally thought. He considered that a very considerable proportion of the best woodlands had gone, and that of the so-called 3,000,000 acres of woodlands that remained a large portion did not carry any trees at all. They wished, therefore, to know what the acreage of woodlands would be in 1925-26, and what crop was growing, and had decided to ask for a survey to be made of two counties, so as to see the course the survey would take, how much assistance they would get from private individuals, and the way in which it could be best and most easily carried out. As to the first two counties to be surveyed, he thought Suffolk would be one, and probably Hertfordshire or Sussex the other. This survey would be carried out in the course of the next four years.

The South Wales Institute of Architects.

The South Wales Institute of Architects last week held their annual summer meeting, when some forty members visited Ewenny Priory and St. Donat's Castle. At the former place the party was conducted over the church and grounds by Colonel and Mrs. Picton-Turbervill, who gave the history of the buildings from the 12th century, when they were first erected. The party afterwards proceeded to St. Donat's Castle, where the members inspected the gardens and grounds. Mr. W. H. Jones, of Swansea, entertained the party with historical and legendary stories of that part of Glamorgan, and the President (Mr. H. C. Portsmouth, F.S.Arc., of Swansea) thanked Colonel Cecil Wilson for his trouble in arranging the meeting and for his architectural notes on the buildings visited.

COMPETITION NEWS.

Wandsworth.

The special committee of the Wandsworth Borough Council appointed to consider the preparation of a scheme for laying-out for recreative purposes a portion of the Watney Estate, Southfield, has reported that thirty-five schemes have been received. The Committee has come to the conclusion that the schemes numbered 34 and 25 were the two best schemes on the grounds that they would lend themselves more readily than any of the others to modification in actual execution to meet the views of the Council, and that at the same time they would be the most economical from the point of future upkeep. The competitor's estimate in respect of the design No. 34 is £18,129 15s., and in respect of No. 25, £24,099. The Committee recommended that design No. 34 be placed first, that design No. 25 be placed second, and that the premiums of 100 guineas and 50 guineas each, respectively, be awarded to the authors of these schemes; and this recommendation was accepted by the Council on Wednesday last.

Design No. 34 is by Mr. P. R. Summerford, of 131, Regent-street, London W., and No. 25 by Messrs. Gerald F. Bridgman and Frank W. Eggins, of 24, Upper Garth-road, Kensington, W.

Auckland.

Designs for a war memorial building, for the Auckland (N.Z.) War Memorial Committee and the Auckland Institute and Museum. (Banned by R.I.B.A.) Sending-in day, February 28, 1922. (See our issue for September 2.)

Labour-saving House.

Designs for a labour-saving house, to cost £2,500, in connection with the Ideal Home Exhibition. Sending-in day, November 30. (See our issue for September 9.)

Birmingham.

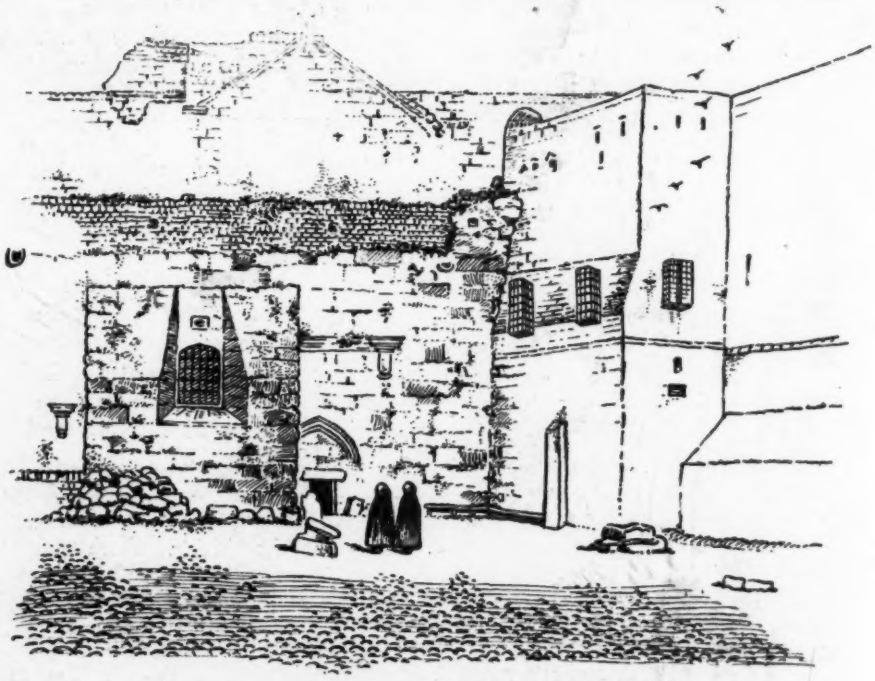
FOR THE WAR MEMORIAL COMMITTEE.—Designs for a war memorial. Sending-in day, October 12. (See our issue for June 17.)

Harrogate.

FOR THE HARROGATE CORPORATION.—Designs for a war memorial. Sending-in day, December 1. (See our issue for September 23.)

Kirkcaldy.

FOR THE KIRKCALDY TOWN COUNCIL.—Designs for a war memorial. Sending-in day, October 31. (See advertisement this week.)



Entrance to the Church of the Nativity, Bethlehem.
From a Sketch by Mr. C. M. C. ARMSTRONG, F.R.I.B.A. (*See p.* 406.)

CORRESPONDENCE.

"The World as We Find It."

SIR,—I cannot quarrel with "Isis" when he complains that I hug my chains. I find them less cumbersome so. There are some who vainly pretend freedom while dragging them clanking behind them.

Russia is bearing a new and heavier set of fetters after having struck off the old bonds. "Isis" will, perhaps, forgive me if, while he sees in me a second Kaiser, I suspect in him an incipient Lenin. The former, at any rate, did build up an army which has not yet disappeared, while the latter only wallows in chaos and destruction.

G. MAXWELL AYLWIN.

Insurance Companies' Signs.

SIR,—In your issue for the 9th inst., you write in connection with the Note on "Advertisements on Letter Boxes": ". . . those of us who can recall the small metal assurance companies' signs which were, in the old days, placed on the fronts of the houses of the assured," &c., leaving the impression that such signs were advertisements. Not so; they were properties, left by testament on occasion to heirs. They carried actual policy numbers, and were put up with the intent of guiding the fire engines of the time—then the properties of the companies—to the site of the fire. If circumstances allowed, on arrival at the scene of destruction, there was the look up to find out whose property was involved, and if a house carried the "Hand-in-Hand" sign and the "Protector" squirt had arrived first, the chances were that the "Protector" went home, leaving the "Hand-in-Hand" flare-up severely alone. There was no advertisement, in the modern sense of the term, in the use of these old signs. In much later times, certain companies, having secured the insurance of whole streets of houses, set to work to put up their signs in wholesale badge fashion on the fronts of such houses; this was pure advertisement, and the custom doubtless continues to-day as advertisement, but the old signs did not have this use. There are excellent collections of these old fire marks to be seen in the Guildhall Museum and the Horniman Museum in South London.

WILLIAM R. POWER.

The Cost of Working-Class Dwellings.

SIR,—In reply to Mr. Holtom, please allow me to say that I have not suggested borrowing at a loss, but that the State should take the long view, and in the end gain. For example: Sir Alfred Mond says he has set aside £15,000,000 for housing subsidies till June, 1922. At 5 per cent. repaid in fifty years, this will cost the taxpayer £824,687 10s. per annum for fifty years. My scheme would cost the taxpayer £350,000 for fifty years, but become an asset of £475,000 during the second fifty years of the whole period of loan, viz., 100 years.

In your columns on June 20, 1919, I put forward the suggestion of a special Housing Board, and some other proposals, as my contribution to the Building Trade Conference of May, 1919, held at the R.I.B.A. The building trade must work out its own salvation, and one fears that the spirit of conciliation which marked the Conference of 1919 has to a great extent evaporated.

The Housing Section of the Ministry of Health has done many things it should not have done, and left undone many things which it should have done, and I still think a special Board quite separate from Government departments, civil servants, and politicians would find the means which would enable the building trade to recover its health.

The Ministry of Reconstruction collected the material information, and the Ministry of Health no doubt has all the facts relating to the present condition, but the promises of politicians have not led to performances; and individuals obviously cannot obtain all the information which is necessary to formulate schemes in detail.

JOHN E. YERBURY.

Inquiry.

A correspondent wishes to know the best way to treat oak in outside work in order to obtain a medium dark-brown appearance, and how to treat oak flooring to obtain a permanent dark-brown colour.

OBITUARY.

Mr. J. Wreghitt Connon.

We very much regret to announce the death of Mr. J. Wreghitt Connon, F.R.I.B.A., who died whilst on holiday at Whitby, on September 21, at the age of 72. He was in good health when he left home on the 5th inst., but was taken ill on the 15th with an attack of influenza, which affected the lungs and heart.

Mr. Connon was a native of Whitehaven, the son of the late Rev. John Connon. Settling in Leeds in early life, he entered into partnership with the late C. R. Chorley, J.P., F.R.I.B.A., with whom he was associated with the planning of many public buildings, both locally and in various parts of the country. On Mr. Chorley's retirement, the style of the firm was altered to Connon & Chorley, Mr. H. S. Chorley, F.R.I.B.A. (Mr. C. R. Chorley's son) being the other partner. Mr. Connon had a wide range of interests and a real love for his profession. He was a past President of the Leeds and Yorkshire Architectural Society, President of the Leeds and District Council for the National Registration of Plumbers, a director of the Gildersome Fever and Convalescent Home, a director of the Hotel Metropole, Leeds (which was erected from his designs), and one time a member of the Committee of the Leeds Hospital for Women and Children. He was architect of the Ida Convalescent Home, near Leeds, and of several churches in the West Riding. The Leeds Co-operative Society's Central Stores and the Leeds and County Liberal Club are examples of his city work, but he also specialised in hospital and school design, and during the School Board regime he was responsible for the plans accepted by as many as thirty different Boards.

Mr. Connon was throughout his career a firm supporter of compulsory registration for architects, and, though of late years he had ceased to take an active part in propaganda work, he took the keenest interest in the recent developments of the movement.

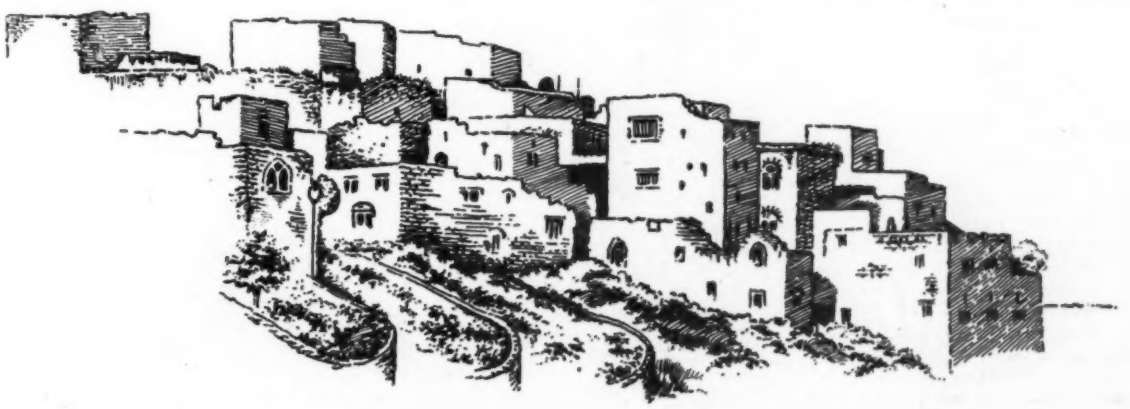
The funeral took place on the 24th inst., at Bardsey Church, which had been restored from Mr. Connon's designs, and in the parish of which he resided. In addition to the family mourners there was a large attendance representing the numerous interests with which Mr. Connon had been associated in Leeds and the surrounding neighbourhood.

The *Journal* of the Royal Institute of British Architects announces the death of the following members of the Institute: William T. Barlow (Associate), of Bognor; James A. Buckley-Jones (Associate), of Henley; G. A. Cox (Licentiate), of Birmingham; Ernest W. Dyson (Licentiate), of Barnsley; George M. Ford (Fellow), of London; Frederick W. H. Hunt (Fellow); Edward W. Keech (Licentiate); Frederick O. Lechmere-Oertel (Fellow), of Allahabad; William H. Littlewood (Fellow), of Manchester; James M. Monro (Fellow), of Glasgow; and Joseph Owen (Fellow), of Menai Bridge.

The death has occurred at Ludlow of Mr. John Butters, architect, of Broad-street, at the age of sixty-four years. He was architect for the Borough and Rural Council housing scheme, and during the war acted as Deputy Borough Surveyor. For some years he was a member of the Ludlow Town Council.

Roman Road Discovered at Glastonbury.

It is reported that the ancient causeway from Street to Glastonbury, at least 1400 years old, has been brought to light as the result of excavations carried out by Alderman J. Morland, a member of the Somerset Archæological Society. The prolonged drought had the effect of indicating very plainly the site of the causeway, and excavations were made in a field adjoining. The old road shows itself plainly as a long streak running straight through the fields to the east of the present road. At a point 10 ft. from the river, a solidly-built piece of road was found, which included many massive baulks of oak timber and also many oak piles. It is presumed that this might have been either a bridge-head or a landing-place, as it is practically certain that the road crossed the river at this point.



From a Sketch by MR. C. M. C. ARMSTRONG, F.R.I.B.A. (*See p.* 406.)

BETHLEHEM.

BETHLEHEM is a curious mixture of old and modern architecture. Its central portion is unspoilt, and to wander through its quaint, narrow streets and precipitous alleys takes us back at once to Biblical times. All the houses are built of large stone blocks, with flat roofs, and where the little moulded work may be found it is bold and simple. Many of the windows have projecting wrought-iron grilles completely covering them for protection. The streets are cobbled, and in one or two cases are in wide, flagged terraces, steep and grass grown, and delightfully picturesque. The majority of the little surrounding hills are now covered with bastard Venetian villas, erected by the wealthy Syrians and Germans; large and pretentious, they make a bad impression on entering from the Jerusalem road.

The cleanliness and fresh-complexioned smiling faces of the Christian inhabitants form a delightful contrast to their Mohammedan neighbours of the Holy City. The women's costumes are a striking feature—dark-toned Zouave jackets worked in coloured braids, and their heads covered with a stiff, white, conical, flat-topped linen head-gear.

The Church of the Nativity is an odd conglomeration of ancient architecture, entrance to which is through the very low door, said to be relative to "the eye of a needle." Above it are seen moulded heads to two larger and more ancient entrances, whilst the flat stone front shows three periods of stonework. The heavily-buttressed guard-room is seen on the left. The severe building on the right is occupied by the monks. The nave of the early Greek church is lofty and impressive with its massive pillars and traces of early frescoes. The etiquette of the various religions regarding the many chapels is amazing.

The cave where The Holy Manger once stood is none too clean, and is dark and tawdry. It is filled with hanging lamps, crude paintings, and offerings from all parts of the world.

Rachel's Tomb is a conspicuous object on the left of the Jerusalem road, and is probably one of the most authentic holy sites in Palestine. It is typical of the many Sheikh's tombs, with its square stone base capped by a cylindrical white dome of concrete. The addition on the left is of a much later date.

The sketches were made by Lieutenant C. M. C. Armstrong, Warwickshire Yeomanry, when acting as A.D.C. to the Divisional General in Palestine.

A Street in Bethlehem
28. 6. 18.

Rachel's Tomb. Nr. Bethlehem
7.7.18.

THE ARCHITECTS' AND SURVEYORS' ASSISTANTS' PROFESSIONAL UNION.

THE second National Convention of Delegates of the Architects' and Surveyors' Assistants' Professional Union was held at Leicester on September 17 and 18, under the Presidency of Mr. A. J. Penty. The following delegates were present: Messrs. W. J. Tayler (Sheffield), J. M. D. Henderson (Ayr and Scottish Divisional Council), John G. Marr (Aberdeen), James Reekie (Glasgow), J. R. Hallett (S. Wales and Monmouth), Cecil H. Shaw (Leeds), Bernard F. Stokes (Birmingham), A. Frank Beer (Exeter), Leslie Fairbairn (Newcastle-on-Tyne), James Grieve (Liverpool), Harry T. Howard (London), Chas. McLachlan (representing the Executive Council), Tom Bertram (Edinburgh and Scottish Divisional Council), and also the following officers: Mr. John B. Hector (Acting Honorary General Secretary), Mr. R. G. Strachan (Hono ary General Treasurer).

The report of the Executive Council for the year 1920–21 was considered and adopted.

Mr. Hector, in moving its adoption, referred to the business of the Union generally and appealed for closer cohesion between the branches and the Executive Council in London. He said by that means only could the Union hope to weather the storm of the present crisis in the professions and to emerge from it a healthier and stronger force. He also paid tribute to the work of his predecessor, Mr. Chas. McLachlan.

The balance sheet, together with the auditor's report thereon, for the year ending May 31 last was adopted; the General Treasurer, Mr. R. G. Strachan, P.A.S.I., referred to the finances of the Union and to its present position.

The following were elected to hold office during the year 1921–1922:—

PRESIDENT.—Mr. A. J. Penty, Lic. R.I.B.A.

VICE-PRESIDENT.—Mr. J. M. D. Henderson, A.R.I.B.A.

TRUSTEES.—Messrs. R. E. Clarke, A. W. Sheppard, A.R.I.B.A., and Harold Swan.

HONORARY GENERAL TREASURER.—Mr. R. G. Strachan, P.A.S.I.

ACTING HONORARY GENERAL SECRETARY.—Mr. John B. Hector, M.S.A.

HONORARY ORGANISING SECRETARY.—Mr. G. N. Hannam, P.A.S.I.

HONORARY ASSISTANT SECRETARIES.—Messrs. W. H. Hamlyn, A.R.I.B.A., and G. B. Tubbs.

HONORARY AUDITORS.—Messrs. G. F. Fox and C. H. Rattenberry.

ASSISTANT GENERAL SECRETARY.—Miss Grace E. Thompson, B.A.

The following members of the Executive Council were also elected for the ensuing year:—Messrs. Thomas Braddock, Robert F. Curling, Lic. R.I.B.A., P. W. Farmer, A. L. Floutier, William H. Hamlyn, A.R.I.B.A., John B. Hector, M.S.A., Harry T. Howard, Henry Hyams, F.R.I.B.A., R. J. Jones, Andrew Mather, M.S.A., C. F. Overy, M.S.A., Chas. Pickford, Lic. R.I.B.A., James Sherlicker, G. S. N. Stone, P.A.S.I., and G. B. Tubbs, A.R.I.B.A.

After his re-election as President of the Union, Mr. A. J. Penty delivered his presidential address, in the course of which he said although the Union was continuing to increase its membership, such increase was not so rapid as might be desired. Undoubtedly the Union was suffering from the slump that had overtaken everything in the building world as in the world outside it. There was a great deal of unemployment in the professions, and that had reacted upon the Union. There was a danger at such a time as the present that members, seeing no prospect of realising their immediate demands, might lose heart. He urged them, however, to stand all the more firmly together. The Union had been built up at the cost of great labour and sacrifice, and would profit by it later if the members held on. This was a testing time. Another good thing that would come out of this crisis was a clearer vision. The Union had come into existence to secure a minimum wage for assistants; the impossibility of enforcing this demand during the present slump had forced it back upon fundamentals. It was becoming apparent that the key to the problem was to be found in regulating the pupilage system, for it would be impossible to raise the position of assistants as long as principals were at liberty to flood the market with the cheap labour that pupils provided. In Scotland, more especially, this system was a crying scandal. It was a boy-labour problem. Boys were exploited as cheap assistants and turned adrift as soon as their articles expired. The result was that many of them had to leave the profession at the end of their long and expensive training through failure to obtain work. In the Middle Ages the guilds protected the apprentice against such abuses, but in these days successful men were able to exploit the ignorance and helplessness of the young. It must be stopped. It should be made a part of the etiquette of the profession that a practising architect should not be at liberty to abuse his position in this respect.

Unemployment in, and the overcrowded state of, the architectural and surveying professions formed the principal subjects for consideration at the first Session. The Scottish delegates present emphasised the need for control of the apprenticeship system in vogue in many of the professional offices in Scotland. Employers there, it was stated, often engaged only pupils or apprentices for periods of from five to six years, paying them a nominal salary and at the end of that period of training dispensed with their services and refilled their offices with fresh pupils. As a consequence the great majority of these trained assistants, finding no means of livelihood open to them in their own town, came to London and other large centres, tending still further to inundate the profession in its most congested areas.

The Convention unanimously adopted a resolution (given in our last issue) expressing alarm at the increasingly overcrowded state of the architectural and surveying professions in the country, and warning the public of the responsibility incurred in entering young people into callings so overcrowded that they cannot now provide sufficient means to those already in them to maintain the status required of them.

The Convention instructed the Executive Council to take what action it might deem expedient to influence the professional institutes to bring into operation a scheme whereby, to some reasonable extent, the influx of new blood into the profession might be regulated.

The Convention then discussed the new rules of the Union and the amendments thereto put forward by the branches and the Union's legal adviser. Provision has been made in these rules whereby the controlling body has power to accept for membership as an affiliated association any association, or section of an association, exclusively comprising within its membership those engaged in occupations set out in the rules of the Union, and having for its object the promotion of the interests of its members.

The Convention was of opinion that it was desirable that the Union should be a constituent body of the National Federation of Professional, Technical, Administrative and Supervisory Workers, and instructed the Executive Council to enter into the necessary negotiations.

The Convention decided to seek recognition for assistant civil engineers and surveyors from the Institution of Civil Engineers and Faculty of Surveyors of Scotland respectively.

Premises for Messrs. Hedges & Butler, Regent Street.—
SIR HENRY TANNER & SONS, Architects.

EGYPTIAN ARCHITECTURE:

ITS ORIGIN, EVOLUTION, AND CONSTRUCTION.

By FRANK H. HEAVEN, A.R.I.B.A.

Introduction.

To make a comprehensive survey of the architecture of any nation or people, it would be necessary to commence at the Creation, to seek out the origins, and then carefully follow each step in the evolution of the many forms and features which have become incorporated with architecture; also, to note the influence of outside agencies in determining the direction of evolution during the period prior to the date at which any particular study is desired to commence.

A careful examination of ancient architecture will reveal the presence of two primary forces which have ever been present, and, together, have operated as the motive power of progress in architecture throughout all the ages. The first is a temporal instinct or desire prompted by necessity which became the basic force in producing utility in design and construction, and the second is a mystical belief in the superhuman which has controlled the conscious and sub-conscious desires for the perfect and became the motive force which prompted the æsthetic or beautifying elements in architecture.

By peculiar significance the first monuments left to us were resting places for the dead. Surely out of the ashes of the dead have risen up great things! The oldest monuments we have as such records are the tombs and temples of the ancient Egyptians, who had advanced very far in matters of civilisation and attained a knowledge of construction which has not been surpassed by any of their successors, either in matters of transportation and use of material or in the size of the resulting structures.

The River Nile is the metaphorical birthplace of architecture, and after the passage of nearly 6,000 years the original creations are still standing—lasting monuments to the greatness, grandeur and highly-civilised condition of an ancient people, objects of intense interest to students of science and art as well as to those who study great social and religious problems of the past ages. Massive and awe-inspiring in their greatness, they are at times repugnant in their display of "force"; yet at other times they excite a feeling of respect and emulation, having weathered the passing waves of time and humanity for so many thousands of years. They are the outcome of an ineradicable desire in man to worship the majestic, especially when displayed in both size and durability. Sculptures, objects of art, ornament, articles of domestic life (see Fig. VIII), mummies, antiquities of the burial of the dead, &c., have also been means of recording and estimating the knowledge, powers, thought, religion and daily life of these ancient people. Hence a collateral study of these should be carried on with that of the parent art of architecture.

The People: Their History and Religion.

Judging from the evidence of sculptured and painted scenes and specimens of articles of daily use preserved to us, the Egyptians appear to have been of a happy temperament, to have enjoyed all the pleasures and refinements of life offered them in their day, to have dressed simply, and to have been of very clean habits. The position of the mother in the family life was an honourable one, the Egyptian often tracing descent from his mother rather than from his father.

Properly to understand the people and also more correctly to ascertain the effect of environment upon their daily life and conduct as reflected in their architecture, a careful examination of the general history of the Egyptians should be undertaken, and with the knowledge gained it is possible for architectural monuments to be more readily understood and appreciated. To take a single monument, and examine or discuss its merits or demerits apart from the history of the creators, is like taking a sentence out of a book and analysing it without reference to the context—a habit to which modern peoples are prone, especially when discussing religious or architectural subjects. The history of the Egyptians can be traced back for more than 4,000 years B.C. An earlier period of hundreds of years must also have preceded the date at which their recorded history commences, during which they had developed from the primitive to the very high standard prevailing at that date.

In almost all countries the chief architectural structures are the outcome of the nation's religious beliefs. Such was the case in Egypt from the very earliest times. Nothing can reveal the character of a nation so clearly as its religion, and nothing has a more permeating influence upon its architecture. They believed that while the bad soul was sentenced to a round of migrations into bodies of unclean animals the good soul was made a companion of the god Osiris for a period of 3,000 years. At the end of this period it returned to earth, re-entered its former body, and again lived the life of a human being. Thus it was most desirable that when this long period had elapsed the soul should be able to find the body which it was to re-enter. The practical outcome of this belief was the process of embalming and the erection of tombs which could be relied upon to last out the 3,000 years and to safeguard the body during that period. That these tombs have failed to fulfil their latter function is, no doubt, due to the greater knowledge of science and to the introduction and use of means of forcing entrances into these tombs by the sacrilegious invaders of later centuries, to the cupidity of man's mind when contemplating any object unattainable or placed beyond his quest for knowledge by reason of the possibility of incurring the wrath of an offended deity, and to a disregard of the superstitious fear which surrounds any cult or religion by sacrilegious heretics.

Egyptian Architecture Generally.

Egyptian architecture is unique in that it has produced monuments throughout all its varying stages of development typical of the many directions in which it has been applied, and which for size and grandeur have never been excelled during the subsequent ages. Not only does Egyptian architecture stand foremost in this respect, but it is an instance of the catastrophe, the decay, and extinction which is the fate of any cyclopean growth, because, except for a few features borrowed by the Greeks, all the characteristic forms of Egyptian architecture have become obsolete and those few forms which the Greeks did adopt have been so greatly modified or improved upon that they have lost all trace of their early origin and are now recognised as of Grecian origin only. Further, Egyptian architecture cannot be said to be the progenitor of any form of modern European architecture, although that of America might possibly be said to have some semblance to it in scale and massiveness. There is, however, a growing tendency on the part of present-day architects to seek amongst Egyptian architecture some inspiration for the evolution of a new style or type of building, but it is hoped that the plagiarist will not be tolerated.

Thebes, the home of the majority of these fine buildings which still exist, escaped the vandals and insurgents of the later centuries, and consequently the buildings are little the worse, except for the mellowing hand of time, than when they were built. The continual desire for supremacy in self-aggrandisement on the part of the reigning monarchs left a distinctive impress on the character of the work erected. Previously of great precision and careful adjustment, it became slovenly—masonry was hurriedly wrought and carelessly placed together, and inaccuracies in setting out and spacing were frequent. Generally, there was exhibited a marked indifference to the previous traditions of conscientious workmanship and careful selection of material. Nevertheless, the result was a wonderful collection of buildings, noble, grand, vast in scale and conception, which became the crowning glory of Egyptian architecture.

Before the Pyramids were built the tombs consisted of a strongly-constructed tomb-chamber hidden in the midst of a great mass of brickwork, often upwards of 200 to 300 ft. in length and 150 ft. in breadth. The finest of this, the "mastaba," type has been explored at Meydum. Later it became a custom to enlarge these "mastabas" by successive thick coatings of brickwork or masonry, each sloping at a steep angle of about 4 to 1. It can readily be understood, therefore, that the Pyramids are practically great "mastabas," and the actual stages of transformation are to be seen in the "stepped" Pyramid at Sakkara, and also in another at Meydum (*see* Fig. I). Altogether there are more than seventy Pyramids extant in Egypt at the present day.

The Pyramids.

In the Pyramid is seen the result of an endeavour to accentuate a deep religious consciousness and aspiration to attain the highest, or to come into contact with the Great Unknown. The Egyptians looked upon the sky or the heavens as being all-perfect, and endeavoured to co-relate their works to it. This they achieved first by great height and second by orientation. In examining some of these examples it is found that the relation of the radius of a circle to its circumference was a factor known to them, and it must be assumed that a proportionate regulation of height to base was also known and was taken to be at its maximum when the radius of a circle (representing height) was set up vertically on a base or area the sum of whose sides equalled that of the circumference of a circle described by the same radius, *i.e.*, in the proportions of 7 of height to 44 of sides. It is also noticeable that most of their buildings were set out upon axial lines corresponding to the cardinal points of the compass, or in some other relationship to the constellations or planets. Great height, size, and durability were of primary importance, and the pyramidal form gives the most perfect solution to the problem. The ideal Pyramid as depicted in hieroglyphic was acute from the very earliest.

In the final Pyramid is seen the result of the two primary motive forces of architecture blended together in perfectly balanced composition. Here is utility with durability on the one hand and the æsthetic or beautiful on the other hand, both expressed without unwarrantable intrusion on the part of either, and without the aid of embellishment or ornament to produce the desired effect. When seen in silhouette these silent pyramids stand out like mighty sentinels. Usually faced with polished granite, when new and viewed in the varying atmospheric changes they present a series of awe-inspiring spectacles—gleaming cold and white in the misty daybreak, shining like molten gold in the sun's bright rays at midday, and burning like the embers of a dying fire in the reflected rays of the setting sun at night—always appealing to the supernatural and calling for deep reverence or superstitious fear.

It must not be supposed that the Pyramids were solitary monuments. They usually stood within large paved courts surrounded by walls, each was supported by a temple with subsidiary buildings, and also around it was ranged a series of "mastabas," or smaller Pyramids. The temple, generally situated on the eastern side, was used for the offering of sacrifices to the dead Pharaoh, and had a college of priests, supported by endowed lands, attached to its service. Within the Pyramids themselves there are only one or two small chambers, one of which contained the sarcophagus, and they were reached by passages planned in a strange and devious manner, and so defended that the sepulchral chamber should be inaccessible (*see* Fig. 2).

THE PYRAMID AT MEYDUM.—The Meydum structure seems to have been the first Pyramid

proper. Its date is about the end of the Third or beginning of the Fourth Dynasty (B.C. 3766 ?). It is square on plan, and its sides or faces incline in layers which were completed by continuous casings sloping from the base to the point (*see* Fig. I). It was probably intended to be a "stepped" Pyramid, as the faces of the "stepped" walls are of dressed stone (Professor Petrie). The angle made by the casing gives a ratio between the sum of the sides and the height of 44 to 7, *i.e.*, equal to the ratio of the radius of a circle to its circumference, and the angle of slope of the sides is nearly 52 degrees. The unit used in this proportion of height to side is 7, and 44 times a length of 25 cubits.

Professor Petrie considers the coincidence of ratio of radius to circumference of a circle referred to above to be intentional. It was adopted in later examples, but whether intentionally or accidentally is open to question. Professor Lethaby suggests a more simple supposition, namely, that the angle of slope contained by the sloping sides of a Pyramid and its base was due to the fact that it would include the several terraces of a "stepped" Pyramid, with a slight adjustment to allow of the use of the whole numbers of 7 of height to 11 of side of base (*see* Fig. I). In any case the angles of slope of several of the early Pyramids are not constant, varying as follows:—The Meydum structure and the Great Pyramid at Gizeh give 51 degrees 52 minutes. The Second Pyramid at Gizeh gives 53 degrees 10 minutes. At Sakkara, to include the several terraces, it would require to be only 49 degrees; whilst at Dahsur the Pyramid has a double angle in the sides, the lower portion being 55 degrees and the flatter upper portion being only 45 degrees.

THE "STEPPED" PYRAMID AT SAKKARA.—The "stepped" Pyramid at Sakkara is of very early date, much earlier than any of the other Pyramids, and although obviously the parent of Pyramids, is really two or more "mastabas" buried in one mass which enclosed and surmounted them and fell back by degrees in a series of terraces (*see* Fig. I). It is not square, being 40 ft. longer one way than the other; the actual measurements are 351.2 ft. from east to west, and 398.9 ft. from north to south. Its probable date is about the Third Dynasty. It is the only one which does not face the cardinal points of the compass accurately, being about 4½ degrees out. The walls of the chamber itself are covered with small green-glazed tiles about 2 in. by 3 in., a few of which are in the British Museum. The soffit of the doorway is carved into representations of stars, and other fragments found suggest that the ceiling was similarly decorated. This scheme of making the ceiling a sky was consistent throughout the works of the Egyptians. The exterior is built of roughly squared stones set to the angle of the face, *i.e.*, inclining inwards at right angles to the face. The mass of walling is of rubble masonry contained by a series of coatings or walls 9 ft. thick of better-class masonry which leans inwards at an angle of 73 degrees 30 minutes, each wall decreasing in height the farther it is from the central core. The terraces thus formed are each 34 ft. lower than the inner or next below.

THE "GREAT" PYRAMID AT GIZEH.—This Pyramid is one of the largest and best known of this type of structure, and was erected by Khufu (Kheops) (B.C. 3733–3700) as his tomb at Gizeh. It followed that of Meydum and has exactly the same angle of slope on the sides, 52 degrees (nearly). Known as "the glory of Khufu," it is "the greatest and most accurate structure ever built," being over 480 ft. high and rising from a base of over 13 acres in extent. Some of the stones used in the outer casing are as large as 4 ft. 11 in. high, 8 ft. 3 in. on bed, and 4 ft. 3 in. on top from face to back, and 6 ft. 3 in. on the sloping face (*see* Fig. II).

Howard Vyse states that the face stones were roughly cut to the proper angle previous to fixing, and the fine dressing executed in place as a cleaning-off process. Stepped ways, formed by the square tops of the casing stones before dressing, were left on the side facing the road by which the stones arrived. The final dressing down seems to have been done by means of scaffolding; "putlogs," still common in modern construction, were in use, and the holes afterwards filled up with small blocks. Some of the lower stones appear to have been joined together with stone dovetails.

Generally known as the "Great Pyramid," it and its two companions at Gizeh were built within a century by one family—a father, son, and grandson—and in all three their axial lines correspond with the four cardinal points or aspects. Great accuracy was exercised in its erection; for instance, the mortar in the joints of the masonry is not thicker than a thumb-nail, and spots of paint left from the process of truing-up the surface are to be found on some of the stones. It is constructed of limestone faced with polished granite.

The height of the entrance above the base line is 47 ft. There is a chamber cut in the solid rock 120 ft. below the surface of the ground, but the royal burial chamber is in the centre of the whole mass, whilst the "Queen's" chamber is immediately below. The central corridor is 28 ft. high, and the ceiling consists of overhanging courses of masonry meeting at the top (*see* Fig. II). The construction of the roof of the royal to b-chamber displays marvellous ingenuity in preventing any squeeze due to the enormous weight of masonry above. The limestone used in the bulk of the work was quarried at El Massarah, 50 miles away, and the granite for the face-work at Assuan, 500 miles up the River Nile. It is stated that 100,000 men were employed for 20 years on this building, and that another 100,000 men were engaged for 10 years on the causeway leading up to it. Some of the stones used were 30 ft. long and weighed 50 tons.

OTHER PYRAMIDS.—Other Pyramids belonging to the Fifth Dynasty are in existence at Abousir, together with their temples and subsidiary buildings, and are of a very highly-developed type.

A Twelfth Dynasty Pyramid at Illahun has its entrance in a well 40 ft. deep, and a sarcophagus at this Pyramid has been worked to a whole number of palms with only an error of 1-1000th.

At Dahsur the Pyramid has a base of 360 cubits and a height of 200 cubits, whilst the walled-in court is 100 cubits wide. Other smaller Pyramids near by measure 100 cubits square.

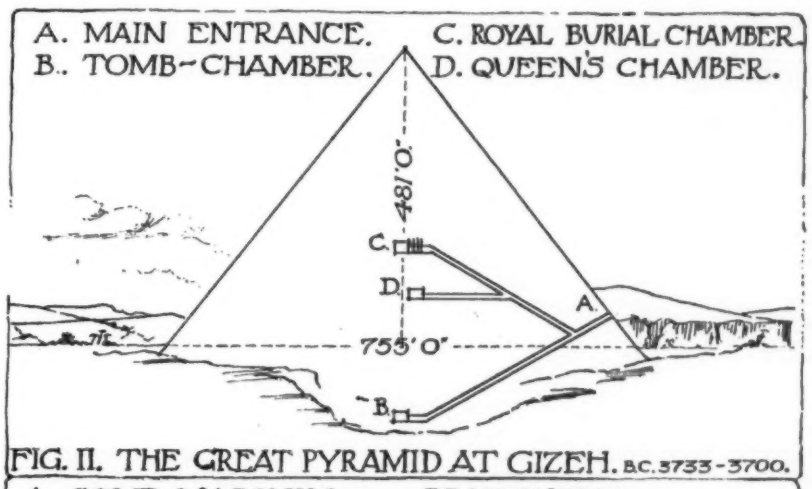


FIG. II. THE GREAT PYRAMID AT GIZEH. B.C. 3733-3700.

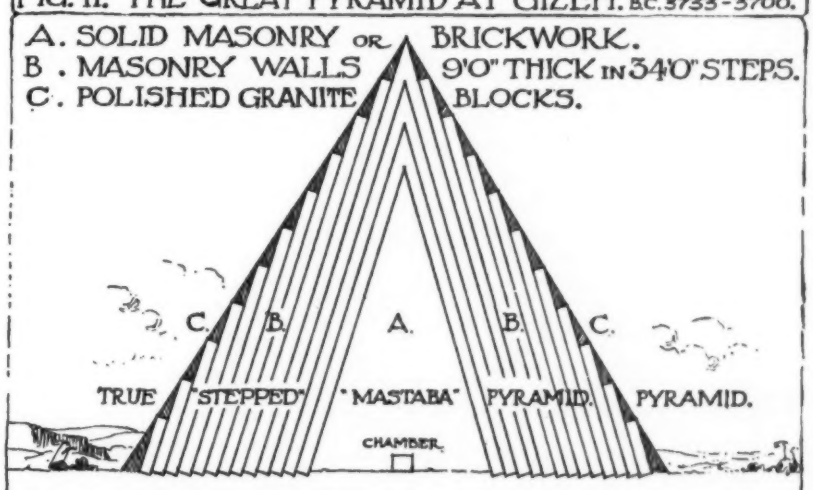


FIG. I. DEVELOPEMENT OF A PYRAMID.

FIG. III. TOMB AT BENI-HASAN XIIth. DYNASTY.

At Hawara there is a Twelfth Dynasty Pyramid with the most devious and tortuous entrance passage possible to imagine.

Tombs.

BENI HASSAN.—During the Twelfth Dynasty a more fully-developed style of tomb is seen. At Beni Hassan, on the east bank of the Nile in Middle Egypt, are rock-cut tombs where columns and entablature are in use, carved

out of the solid rock (*see* Fig. III). These early columns are of a form seldom seen in later work in Egypt; tapering towards the top, they are surmounted by a square slab or abacus. Some are polygonal with 16 or 32 sides, each side being slightly concaved or fluted, and are claimed to be the prototypes of the Greek Doric order; there is just reason for this claim, as there are some notable points of resemblance in the square abacus, the fluted surface, and the tapering outline.

The next acquaintance made with the column is in the temple architecture during the Theban Period, when it was more fully developed and received the characteristic forms associated with Egyptian architecture (*see* Figs. V and VII).

Obelisks.

Relief sculptures show that very early shrines had pairs of masts or posts standing before them, and it would appear that the proper function of an obelisk is to stand in a pair before the great eastern gates of the temples. In design it is representative of the Pyramid, being an immensely tall double-angled Pyramid of one stone. Subservient to its use is another structural ideal—delight in balance. Originally used as boundary stones in determining the limits of Egyptian towns, they later became symbolical of the sun and its worship. They are perfect monoliths, the outcome of an ineradicable desire to worship big stones, a force which has always been at work in architecture throughout the ages.

In front of the grand entrance to the temple at Karnak, Thothmes erected two obelisks; one of these, which now stands before the Church of St. John Lateran in Rome, is the largest and most splendid monument of its kind. Another obelisk erected by this monarch has been re-erected at Constantinople; another, which originally stood at Heliopolis, and later at Alexandria, is now on the Thames Embankment, London, and known to us as "Cleopatra's Needle." Its companion has been erected in New York.

It is said that the sides of obelisks are slightly convex and were so designed to counteract the optical illusion of a perfectly straight line appearing to be curved.

The practice of setting up these "everlasting" stone monuments by the Pharaohs in honour of their gods has been repeated by almost every nation since, and even to-day numbers are being set up throughout England to commemorate the sacrifice of those who gave their lives in the war. No better monument could be chosen to convey to future generations the ideal of high aspirations, singleness of aim, and wonderful powers of endurance requisite to achieve distinction and honour amongst men.

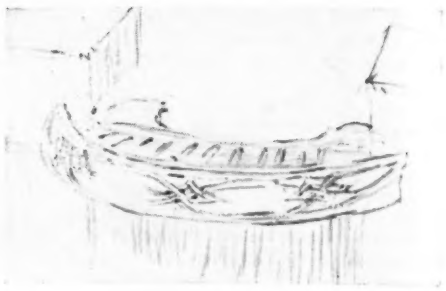
(*To be concluded.*)

THE HAMPSHIRE ASSOCIATION OF ARCHITECTS.

THE Hampshire Association of Architects held a meeting at Winchester on September 20, to meet Mr. Paul Waterhouse, President of the Royal Institute of British Architects.

Sir Wm. Portal, Bt. (President of the Hampshire Association), in welcoming Mr. Waterhouse, recalled the fact that his father, the late Alfred Waterhouse, built the houses now occupied by Lord Selborne at Blackmoor, by Mr. W. H. Myers at Swansea, and by the late Mr. Harris at Steventon Manor. The last-named was the old squire's house and the Old Rectory where Jane Austen wrote her novels. Mr. Alfred Waterhouse was also responsible for the enlargement of Sir William's father's house, and Mr. Paul Waterhouse drew up the details of the work.

Mr. Waterhouse, in his address, referred to the subject of architectural education, and to the growth of the Architectural Association of London, which had now become a very large



An Old Grate Front.

organisation. To-day, he said, there was a systematical college education which was most praiseworthy, and systematic education by professional teachers who were practical men would be of the greatest benefit. The spread of education would mean that the uneducated man would drop out of the profession. A sound education would be the basis of the future architect, and no architect could afford in the coming years to neglect it. A very large network of education had been formed which would lead to great things. It might be harder for the young architect to approach the profession, but it would lead to architects being looked up to as men with greater knowledge.

MEETINGS.

MONDAY, *October* 3.

Society of Engineers.—Mr. Gerald O. Case on "The Winning of Tidal Lands in British Guiana." At the Rooms of the Geological Society, Burlington House, W. 5.30 p.m.

TUESDAY, *October* 4.

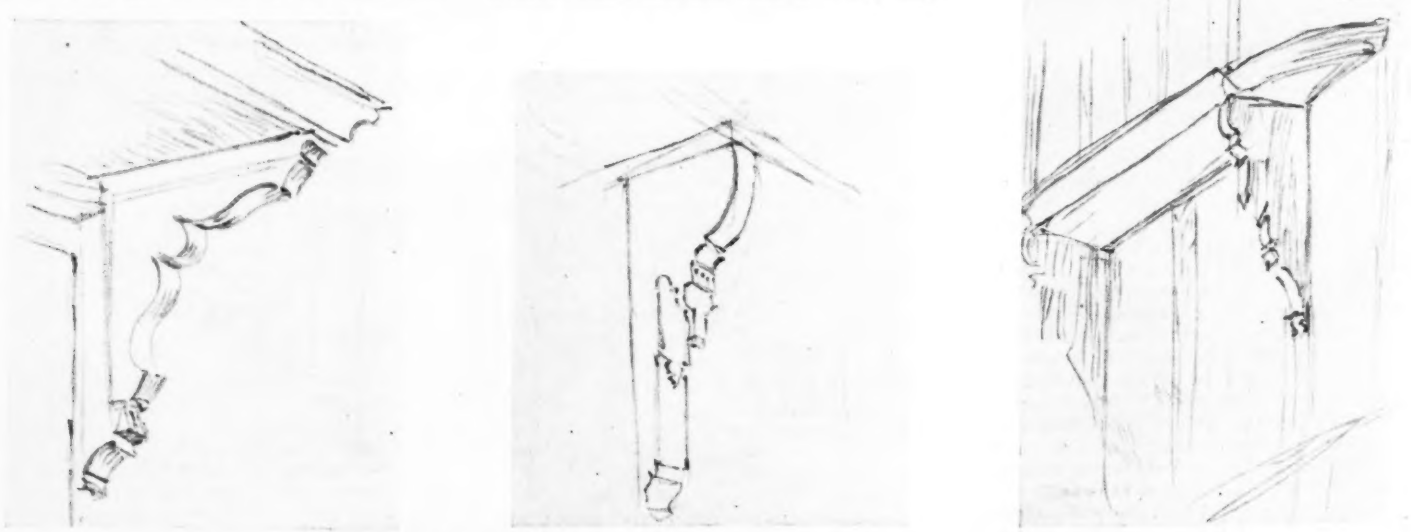
Institute of Sanitary Engineers.—Social entertainment. At Caxton Hall, Westminster. 7.30 p.m.

THURSDAY–MONDAY, *October* 6–10.

Town-planning Institute.—Conference at Cambridge.

Statuary Groups on Kelvinway Bridge, Glasgow.

Members of the Parks Committee of the Glasgow Corporation have conferred with Mr. H. B. Burton in regard to the expediency of the Corporation proceeding with the casting into bronze of the statuary groups for the Kelvinway Bridge, and it has been decided to delay the work till the end of the current year.



Sketches of Brackets. (*See* "SOME COUNTRY NOTES," *p.* 411.)

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ILLUSTRATIONS.

Portsmouth War Memorial Competition.

The site chosen for this memorial formed one of the entrances to Victoria Park, adjoining the railway embankment. In the scheme illustrated, the railway arch was refronted in stone and incorporated with the central feature by high, flanking, semi-circular walls with open screens connecting them with the central feature. The plinth formed a continuous line with the low boundary walls in front of the central monument, and two entrance gates with piers were placed across the angles of the front wall. These replaced the existing gates to Victoria Park. The main walling, &c., was to be in Portland stone, with artificial stone paving. The estimated cost was £9,890.

The design illustrated, from the exhibit at the Royal Academy Exhibition, 1921, was submitted in the competition by Messrs. W. F. Granger & J. R. Leathart, of 8, New-square, W.C. 2.

Memorial Reredos.

The design for a decorative Gothic memorial reredos is from the exhibit in this year's Royal Academy Exhibition, and is suggested as a memorial to members of the congregation of a church in the Midlands who fell in the war. The altar already exists, but the reredos is in abeyance owing to lack of funds. The panelling at the sides of the reredos is also part of the scheme. It is suggested that the memorial should be carried out in English oak, with a brass plate to indicate its purpose.

The design is by Mr. Thomas S. Bowman, of 2, Nevis-road, Balham, S.W.

Cottage on Pink Hill, Princes Risboro'.

This is a week-end cottage and garage, designed without servants' accommodation. It has one living-room and a scullery-kitchen with three bedrooms over. The site is on the crown of the Chiltern Hills, near Princes Risboro', and has a view of the Vale of Aylesbury. The materials are brick walls and plaster and a flat-pitched concrete roof on which pantiles are bedded. Mr. Charles Cowles-Voysey, A.R.I.B.A., of 88, Gower-street, W.C., is the architect. Our illustration is from the exhibit in this year's Royal Academy Exhibition.

Lydney War Memorial.

This war memorial serves a dual purpose—first, to provide houses for maimed or partially-incapacitated soldiers; and, second, to form an approach to the public park. The construction is as far as possible of concrete, and, with a view to minimising future upkeep as much as possible, the least quantity of timber has been used, the windows being of steel, the first-floor construction of reinforced concrete, and the floor coverings of "Ebnerite."

The monument, forming one gate pier, is of Forest of Dean stone, and has been executed by the United Stone Firms, Ltd. The general contractors were Messrs. Dawkins, Harris & Weaver, of Chepstow, Mon., and the principal sub-contractors were: Messrs. Gardiner & Co. (Bristol), windows; the Self Sentering Expanded Metal Co. (concrete reinforcement); Mr. J. F. Ebner (floor coverings); and Messrs. Wilmer & Co. (sanitary goods and ranges).

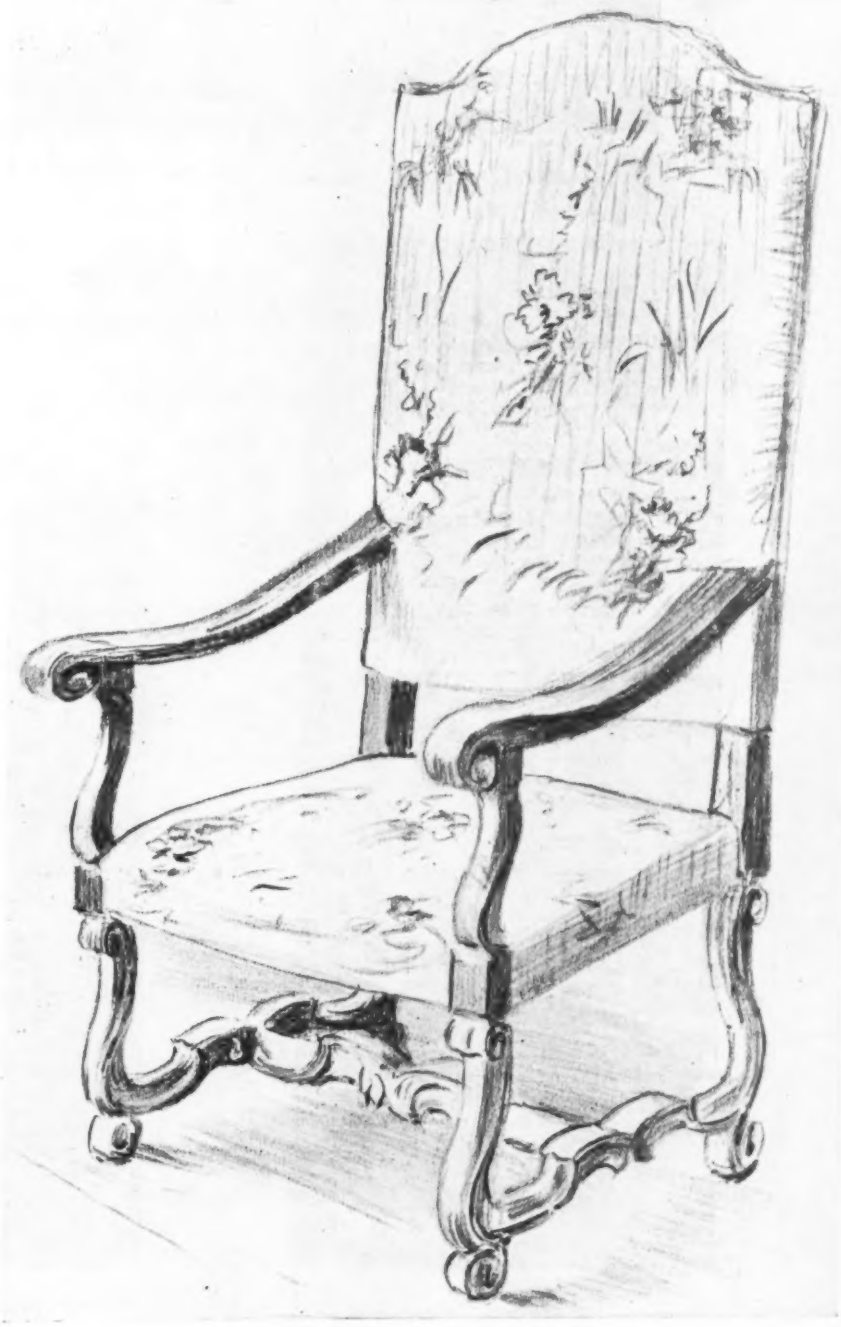
The whole of the concrete blockwork was manufactured on the site from the design of the architects, Messrs. Kennard & Kennard, of 12, Gray's Inn-square, London, W.C. 1.

The oak half-timbering faces due south, and in order to assist it to weather the very trying heat of the past few months it was treated with two coats of raw linseed oil and afterwards slurried up in soft soap, with the result that only very slight shrinkage has occurred.

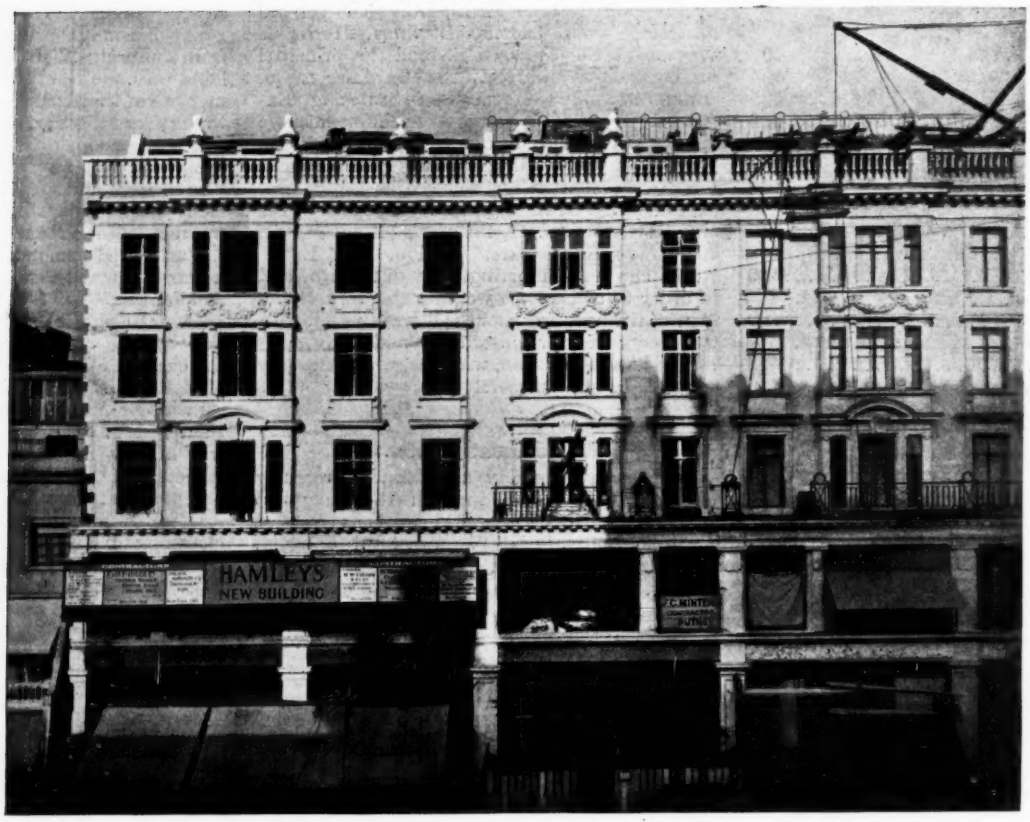
Some Country Notes.

A Saturday, Sunday and Monday recently devoted to a tramp through the delightful country south of Tunbridge Wells yielded a large measure of architectural interest. If one's sketches could convey a fair reflection of this, they would be a store of pleasure, but one seldom feels that the record is the least worthy of the opportunity. The villages of Frant, Mayfield, Hawkhurst, Goudhurst, and Brenchley may be included in an easy circuit from Tunbridge Wells and back. We were a very little way out from Tunbridge Wells before we met with the exceptionally interesting bit of topiary work over an old cottage gateway, which is enough to suggest whether living gate posts and archway cannot be made quite as nice in form and use as any architectural treatment of bricks or stone or wood. Farther on we met with an exaggerated development of the art (at Horsmonden), which serves both as a warning against excess and a hint of further possibilities. The folk who think good building effects can only be got by architects, or at any rate by elaborate effort, would do well to note the charm of the old cottage gable in its setting of foliage at Mayfield or the old oast-house ruin at Brenchley. In these country rambles the question often arises whether the architect was a very necessary factor when the other subjects of these sketches were made—the quaint brackets and delightful old tombstones. Are we even sure that, in the making of the charming old tower of Brenchley Church (its solid sturdy form and dainty turret), an architect drew it all out on paper first, or was there an architect, as we understand him, present at all?

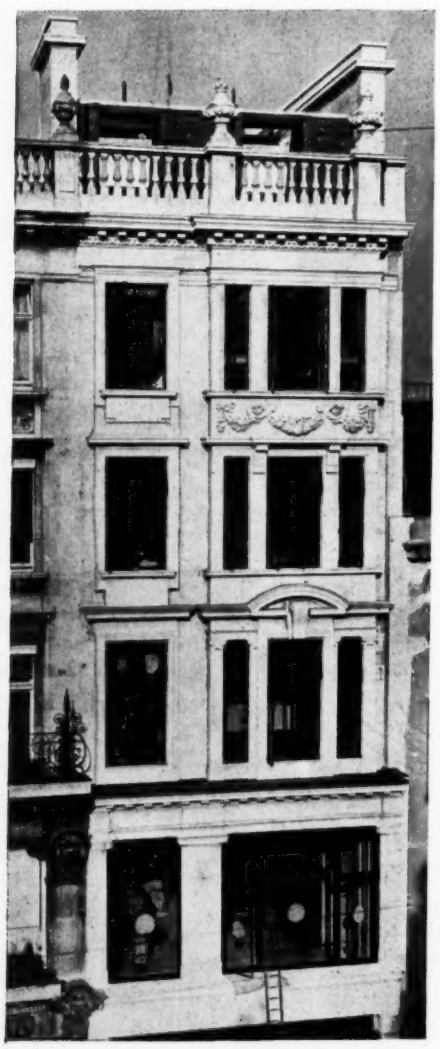
T. RAFFLES DAVISON.



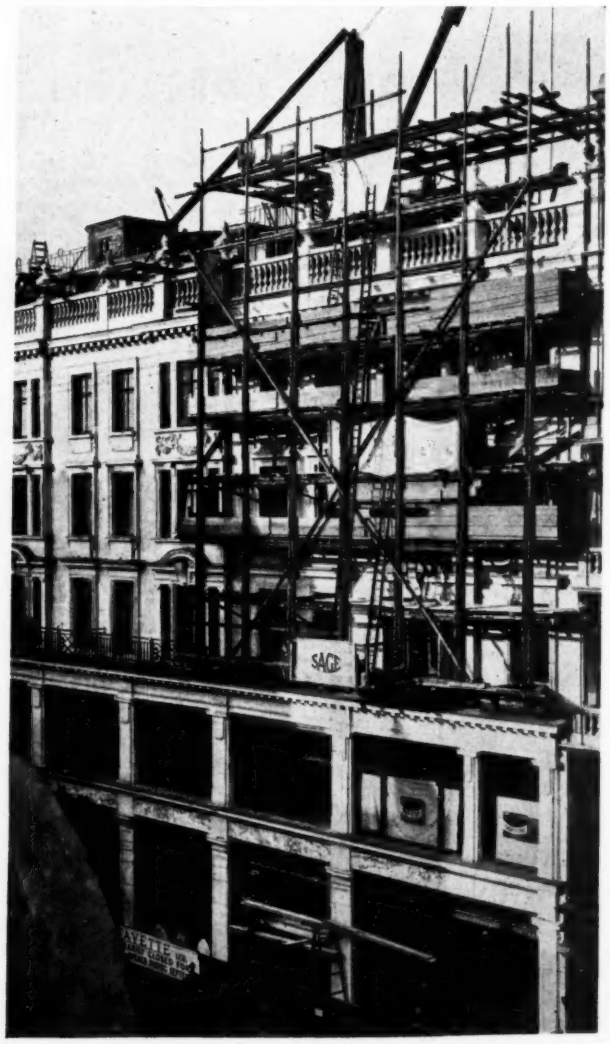
Old Chair at Goudhurst.



Premises for Messrs. Hamleys. MESSRS. COLLCUTT & HAMP, FF.R.I.B.A., Architects.



Premises for Messrs. Gerrards et Cie.
SIR HENRY TANNER & SONS, Architects.



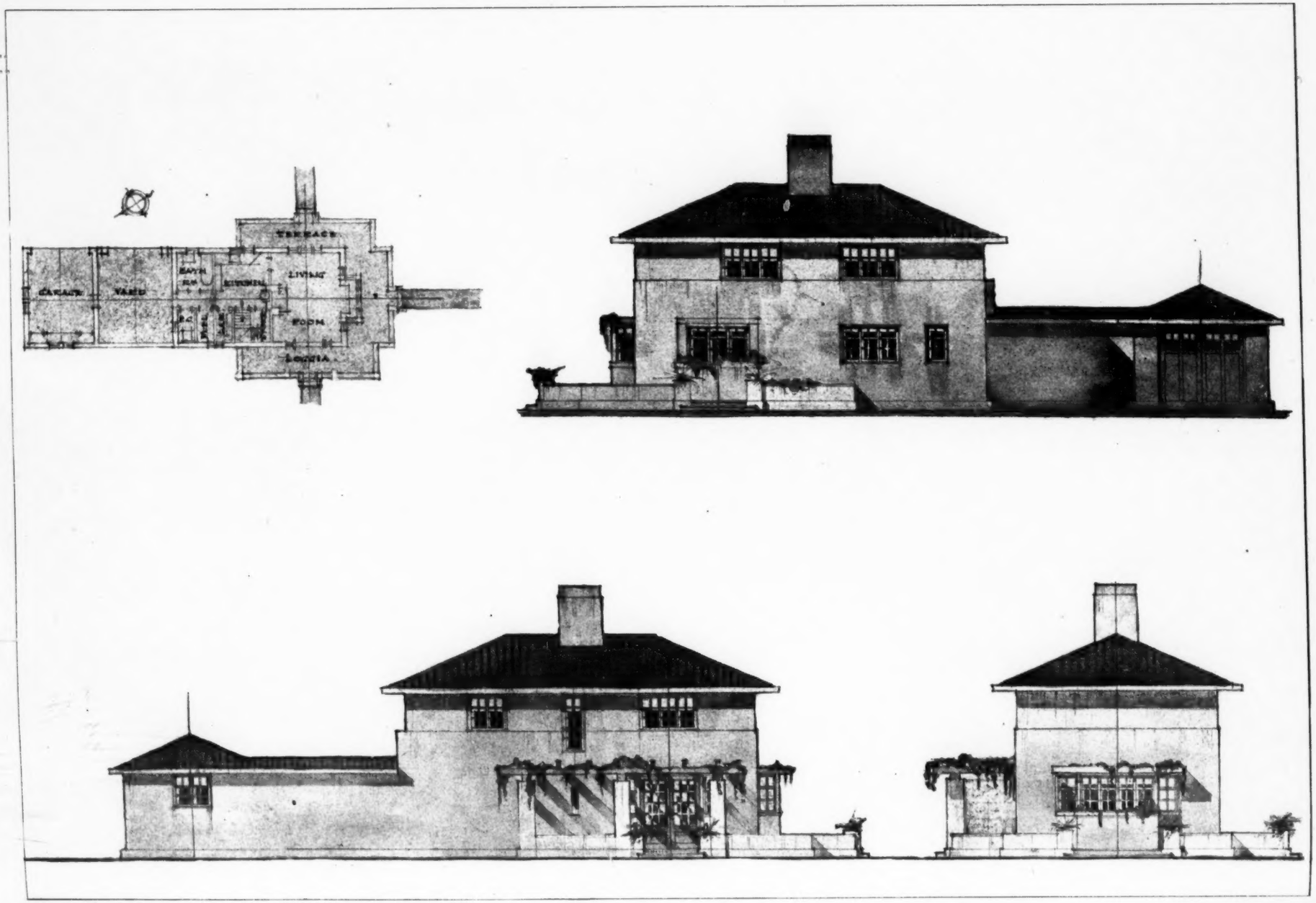
Premises for Messrs. Lafayette, Ltd.
MR. WILLIAM WOODWARD, F.R.I.B.A., Architect.

BUILDING IN REGENT STREET.

Mayfield
Print
Mayfield

RAMBLING SKETCHES, BY MR. T. RAFFLES DAVISON.

SOME COUNTRY NOTES.



R.A. EXHIBITION.

COTTAGE ON PINK HILL, PRINCE'S RISBORO': MR. C. COWLES-VOYSEY, A.R.I.B.A., ARCHITECT.

R.A. EXHIBITION.

COTTAGE ON PINK HILL, PRINCE'S RISBORO': MR. C. COWLES-VOYSEY, A.R.I.B.A., ARCHITECT.

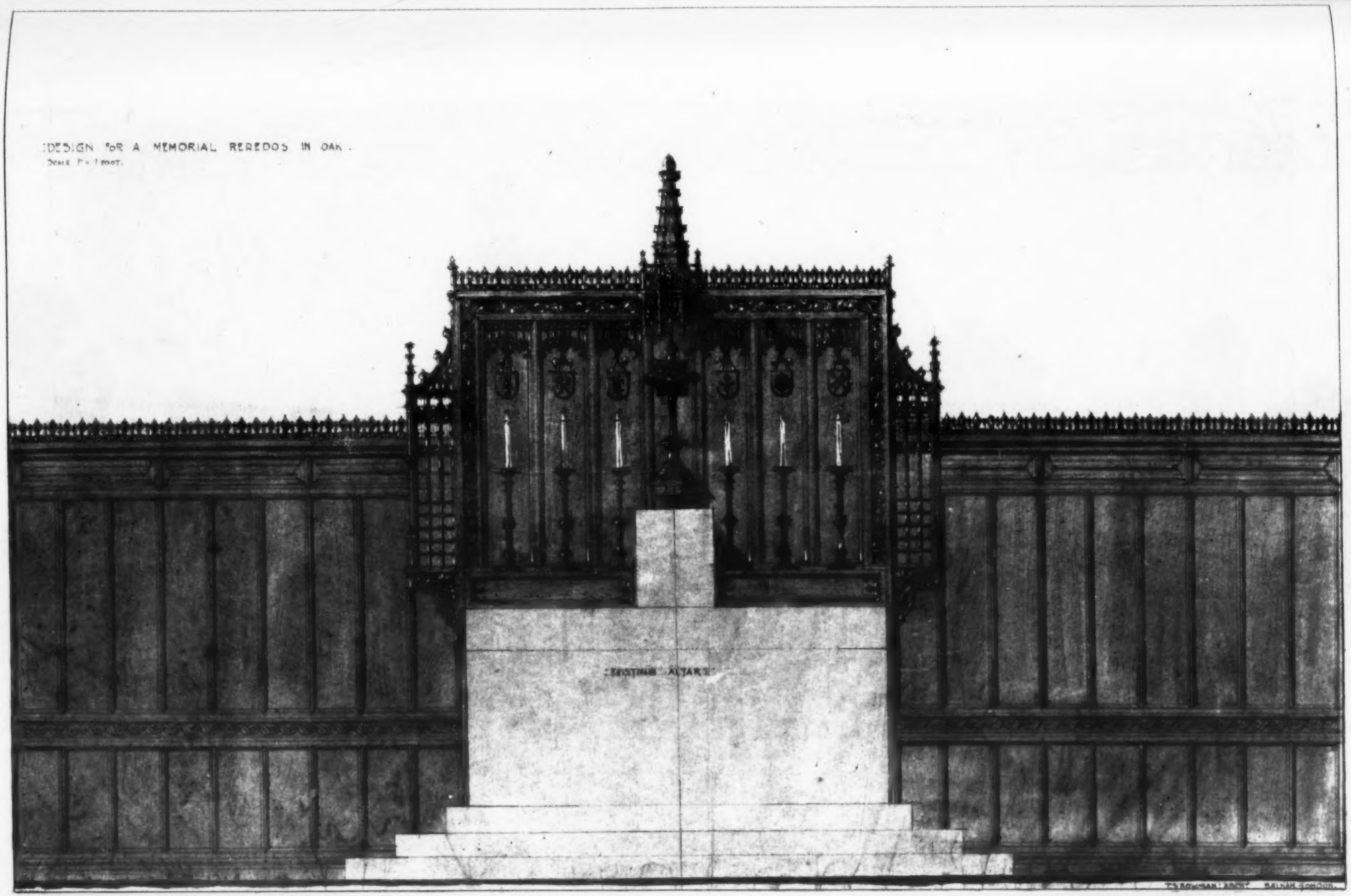
PERSPECTIVE VIEW:

PORTSMOUTH WAR MEMORIAL COMPETITION: (Design commended by Assessor)

MESSRS. GRANGER & LEATHART, ARCHITECTS.

R.A. EXHIBITION.

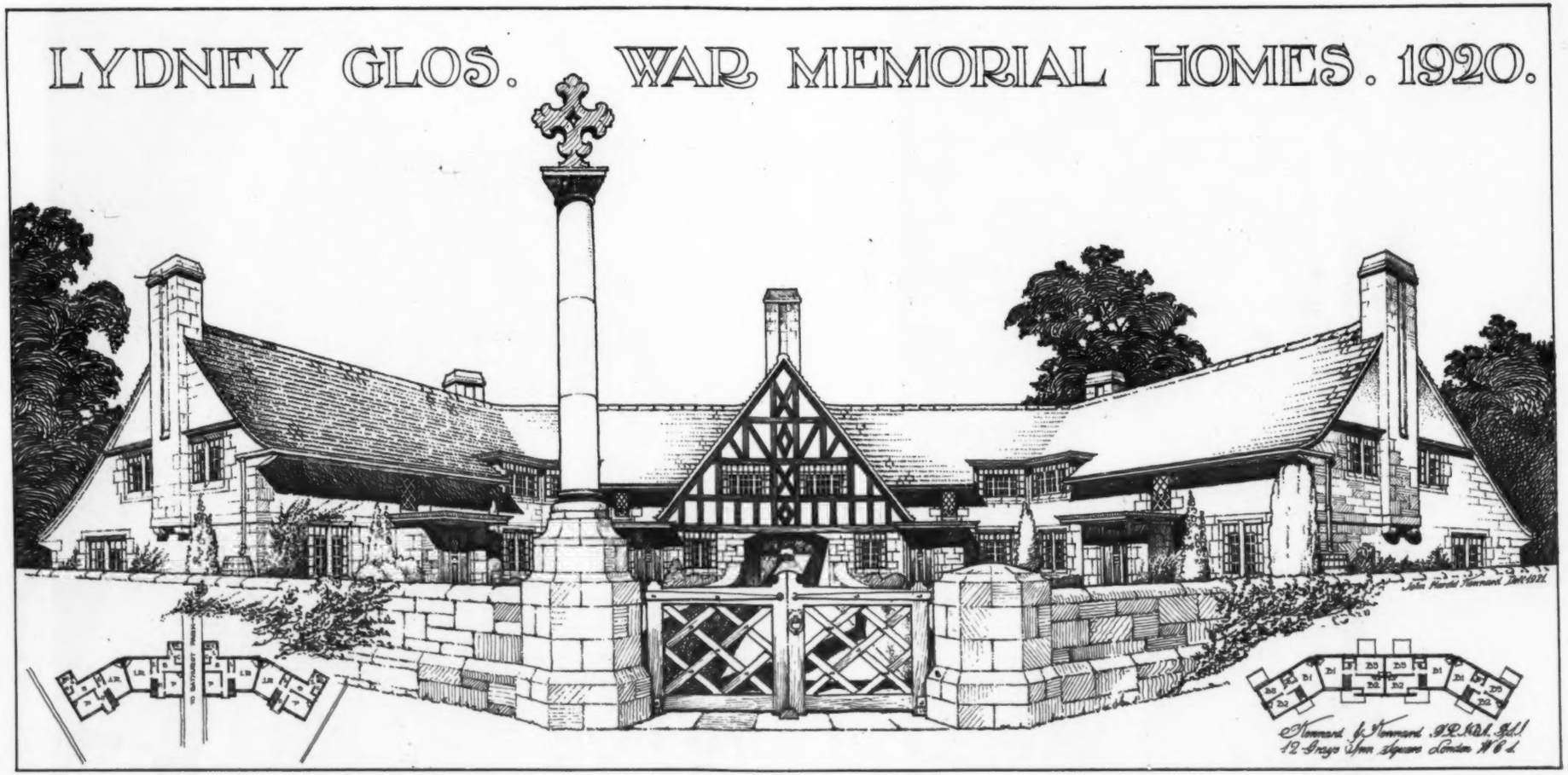
MESSRS. GRANGER & LEATHART, ARCHITECTS.

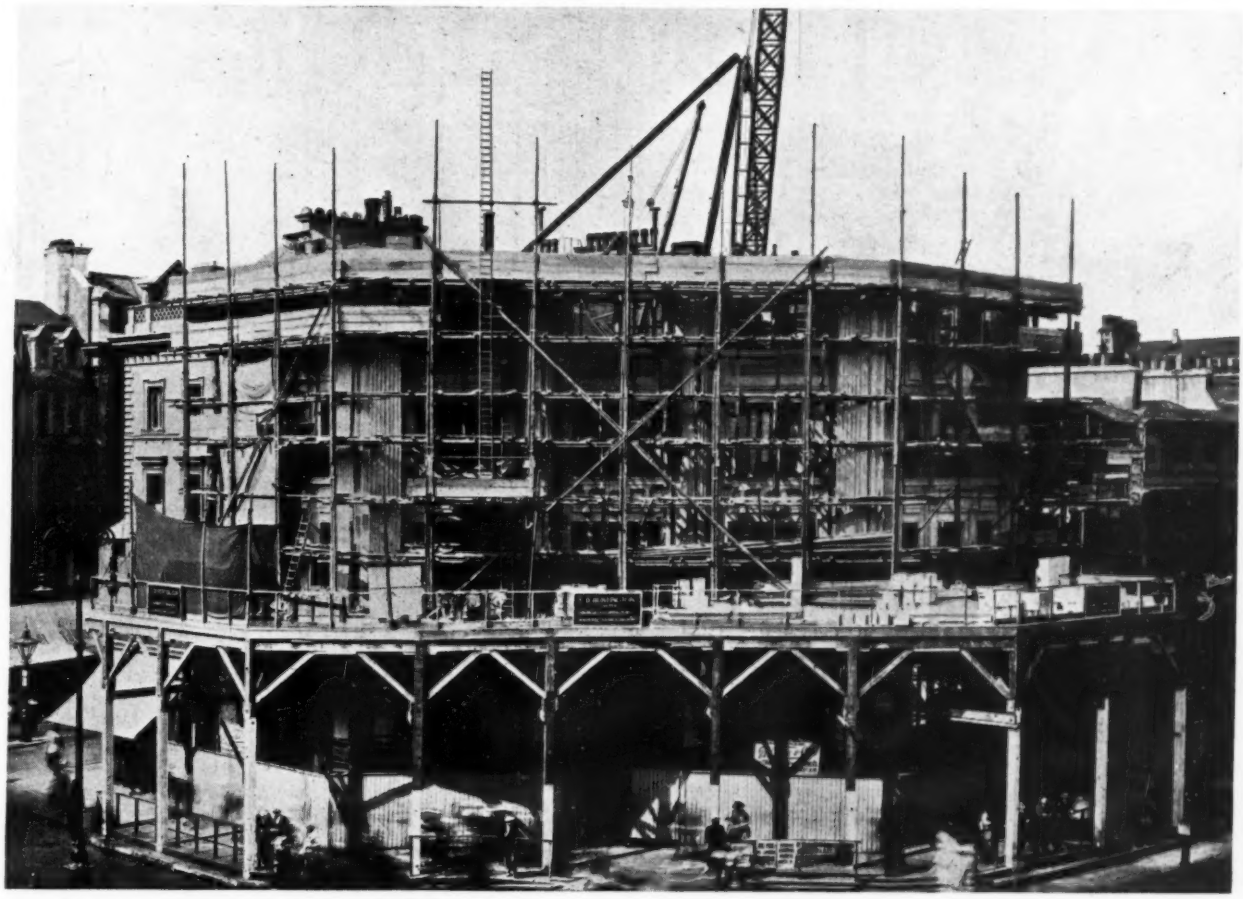


R.A. EXHIBITION.

DESIGN FOR A MEMORIAL REREDOS IN OAK. MR. THOMAS S. BOWMAN, ARCHITECT.

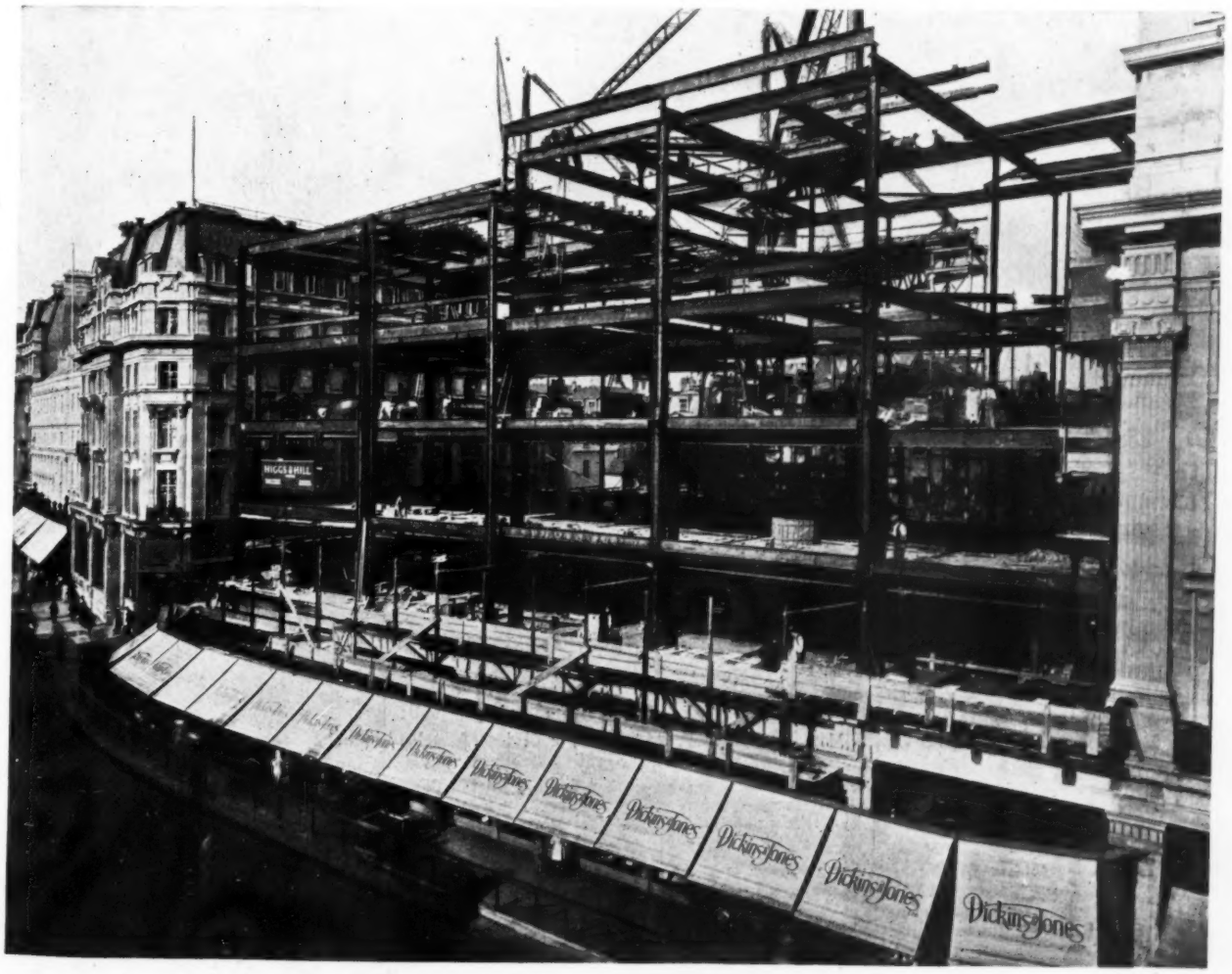
LYDNEY GLOS. WAR MEMORIAL HOMES. 1920.





Premises for Messrs. J. R. Dale & Co. MESSRS. MEWES & DAVIS, Architects.

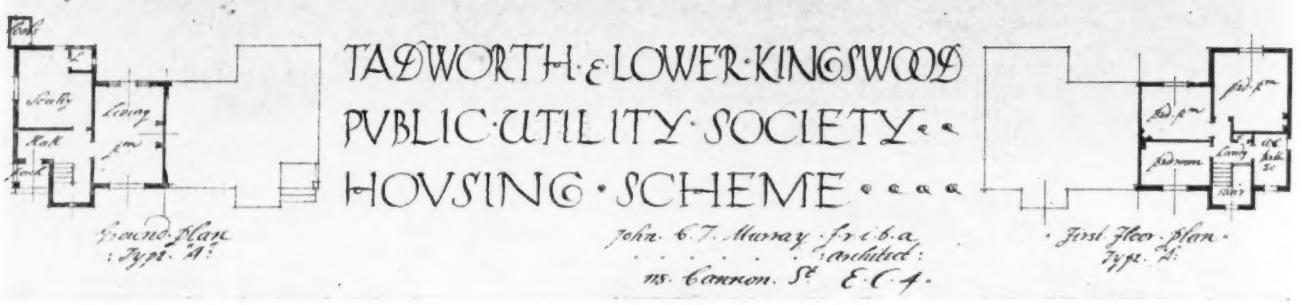
[The frontage of this building is in conformity with the design of the segment of the building on the opposite side of the Circus, which was designed by Sir Henry Tanner & Sons.]



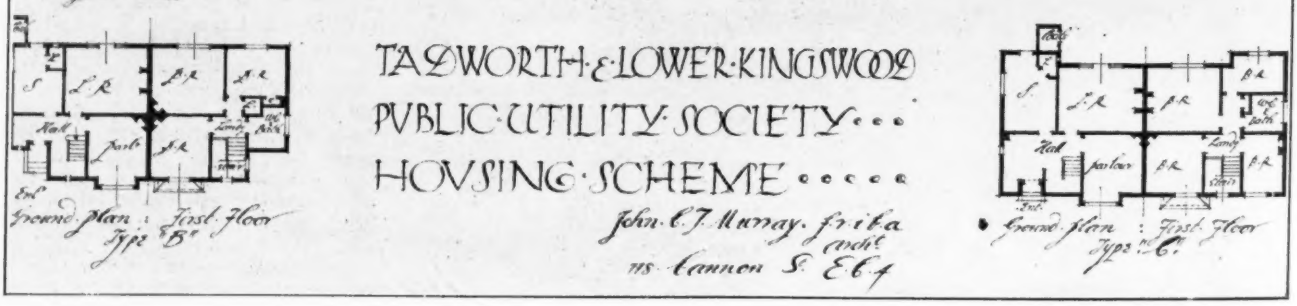
Premises for Messrs. Dickins & Jones. SIR HENRY TANNER & SONS, Architects.

BUILDING IN REGENT STREET.

View of North Portion.



View of South Portion.



Houses at Tadworth, Surrey.

MR. JOHN C. T. MURRAY, F.R.I.B.A., Architect.

THESE houses are in course of erection in Kingswood-road, Tadworth, for the Tadworth and Lower Kingswood Public Utility Society, with Government assistance under the Ministry of Health. There are twenty-two houses forming eleven semi-detached blocks. Fourteen of the houses are finished and the remainder are approaching completion. The houses are of three types, "A," containing living-room, scullery and three bedrooms; "B," containing living-room, parlour, and three bedrooms; and "C," containing living-room, parlour, and four bedrooms; all have bathrooms (hot and cold), lavatories, w.c.'s, coal-stores, and larders. The scheme comprises six houses of type "A," twelve of type "B," and four of type "C."

The foundations are on chalk; the walls are of brick, rough-cast; the roofs are covered with tiles; internal partitions are of concrete slabs; the ground-floor rooms have "Marbolith" jointless flooring; window-frames and casements are of wood. The houses face east and west, and are arranged on an irregular frontage line grouped on the west side of a new road from Tadworth Station to Epsom. Gas and water are laid on from public mains, and the drainage is to cesspools. The plans were prepared by Mr. John C. T. Murray, F.R.I.B.A., of Cannon-street, E.C.4, and the work is being carried out by Mr. Donald M. Ross, of Banstead, Surrey.

LEGAL SECTION.

NOTES ON CURRENT CASES.

Trade Union Law.

In order to prevent trade unionists from falling into a pitfall of the law, which Lord Justice Scrutton characterised as heartbreaking to the layman litigant, we think we ought to call attention to the recent decision of the Court of Appeal in the case Rex *v.* Cheshire County Court Judge and United Society of Boilermakers, *Ex parte* Malone (1921, 2 K.B. 694). The plaintiff had been expelled from his trade union for reasons it is unnecessary for the purpose of this note to enter into, and he had brought an action in the county court in which he claimed a declaration that the resolution of the district committee of the union by which he was expelled was *ultra vires*, as being unauthorised by the constitution of the union or by its rules, or by the Trade Union Acts, and an injunction was claimed. No claim for damages was, however, included in the particulars. The county court judge found that the resolution was *ultra vires*, but he held that he had no jurisdiction to entertain the action, as under section 56 of the County Courts Act, 1888, as amended by the Act of 1903, the court could only entertain a personal action where the debt, demand, and damages claimed were not more than £100.

The case turns upon the question of jurisdiction, for the jurisdiction of the county courts is limited as stated above, and under section 89 of the Judicature Act, 1873, the jurisdiction to grant such relief, redress, or remedy, by injunction or declaration as the High Court has power to do, is limited to "causes of action within its jurisdiction."

In this case no damages were claimed in the first instance, the action being simply brought for a declaration and injunction. At the trial, when this difficulty became apparent, the county court judge had been requested to amend the claim by inserting a claim for damages within the limits prescribed to give jurisdiction, but in his discretion he had declined to adopt this course. The claim in the correspondence was £150, and the proposed amendment was a claim of £88. That amount might have covered the claim for loss of wages, but it did not cover all the damages sustained if the claim were substantiated that he had wrongly been expelled from his union, so, as the Court of Appeal expressed it, the county court judge had a perfect right to refuse to amend, as it might be said the amendment was merely suggested to give jurisdiction. There was a further difficulty, for it has been decided by the Court of Appeal in a case, Kelly *v.* National Society of Operative Printers' Assistants (84 L.J. (Q.B.) 2236), that a member of a voluntary society such as a trade union cannot recover damages from the union in any court. The Divisional Court had held that the county court had jurisdiction.

The Court of Appeal, reversing the divisional court, held that the county court had no jurisdiction to entertain this action, and that an injunction or declaration can only be granted in the county court when the action is one in which the amount of the claim is within the amount specified by the County Court Acts. If there is no money claim, and cannot be a money claim, as, for instance, in this case, because of the decision in Kelly *v.* National Society of Operative Printers' Assistants, or, to take another example cited by the court, an action against a highway authority for non-repair of a highway where no damages can be claimed as against the highway authority, the action for a declaration or injunction cannot be brought in the county court, for an action brought in that court must have a monetary limit.

The decision, it must be observed, is in this case based on two grounds: (1) There was no monetary claim at all, and if a monetary claim had been made it must have exceeded the statutory monetary limit of jurisdiction, for there was no question as to an abandonment of part of the claim under section 81 of the County Courts Act; and (2) there could be no monetary claim because of the decision in Kelly's case.

So far we have only dealt with the actual decision of the court on this point of jurisdiction, which we hope we have made plain as it may obviate trade unionists throwing away costs by bringing an action of this kind in the county courts, but in the course of the case a further point was alluded to in connection with trade union law generally which will no doubt have to be decided in the future. In Kelly's case the Court of Appeal decided that a member of a trade union in the position of the plaintiff in this case could not recover damages against the trade union, because, being a member of the body, he would be in the position of recovering damages as it were against himself, but the court granted an injunction; and, again, in Osborne's case (1911, 1 Ch. 540), the court granted an injunction. In cases brought in the High Court there is jurisdiction, of course, to grant an injunction or to make a declaration quite irrespective of whether damages could be claimed or not, as that point is only material as regards the limited jurisdiction of the county courts, but Lord Justice Scrutton has now pointed out that the reasoning applied to damages in Kelly's case might easily equally apply to the granting of an injunction, for if a man cannot claim damages against a body which includes himself in its trade name, does it not logically follow he cannot either enjoin himself?

This question was not argued in Kelly's case nor in Osborne's case, so the law at present stands that in the High Court an injunction can be granted in such a case, and the Court of Appeal has recently done so in what are known as "Lord Lever's cases," Braithwaite *v.* Amalgamated Society of Carpenters, Cabinetmakers, and Joiners, and Ashley *v.* General Union of Operative Carpenters and Joiners (*The Builder*, July 8). Those cases are not yet reported in full in the law reports, and the point raised here may not have been taken in them. Possibly therefore this question may be raised and require decision in some future case.

Insurance: Answers in Proposal Forms.

A decision of the Privy Council in the case Condogianis *v.* Guardian Assurance Co., Ltd. (1921, 2 A.C. 125), an appeal from the High Court of Australia, may usefully be referred to as showing the law relating to proposal forms and policies of insurance. The action was brought by the plaintiff (the appellant) to recover for a loss under a policy of fire insurance. The Company's proposal form provided: "This proposal is the basis of the contract and is to be taken as part of the policy, and (if accepted) the particulars are to be deemed express and continuing warranties furnished by or on behalf of the proponent, and any questions remaining unanswered will be deemed to be replied to in the negative. The proposal is made subject to the Company's conditions as printed and/or written in the policy to be issued hereon and which are hereby accepted by the proponent." Among the questions in the proposal was one in the following terms: "Has proponent ever been a claimant on a fire insurance company in respect of the property now proposed or any other property? If so, state when and name of company." This question had been answered, "Yes, 1917, Ocean." This answer was true so far as it went, as the proponent had in the year 1917 made a claim against the Ocean Company in respect of the burning of a motor-car, but the proponent had omitted to state that in 1912 he had also made a claim against the Liverpool & London & Globe Company in respect of the burning of a motor-car.

The question was whether this answer was untrue so as to be a breach of the warranty in the proposal form which was the basis of the contract. Their lordships in the Privy Council affirmed the decision of the Australian High Court, and held that the answer was not true, for to answer the question asked thus in the singular might exclude important items and misrepresent the true facts, and thus being a breach of warranty the insured could not recover on the policy. The following statement of law taken from the judgment may be useful: "It is a first principle in the law of insurance, on all occasions, that where a representation is material it must be complied with—if immaterial the immateriality may be inquired into and shown; but if there is a warranty it is part of the contract that the matter is such as it is represented to be. Therefore, the immateriality or materiality signifies nothing."

Here it must be observed there was an express warranty in the proposal form, but it was argued that as the policy contained a clause, "If there be any material misdescription of any of the property hereby insured . . . or any misrepresentation as to any fact material to be known for estimating the risk, or any omission to state such fact, the Company shall not be liable upon this policy so far as it relates to property affected by such misdescription, misrepresentation, or omission," the materiality of the fact was thus introduced into the policy in the sense of making the materiality of every statement or answer part of the basis of the contract, but the Privy Council held that the reference to materiality in the condition quoted did not delete the warranty and declaration of the basis of contract contained in the signed proposal.

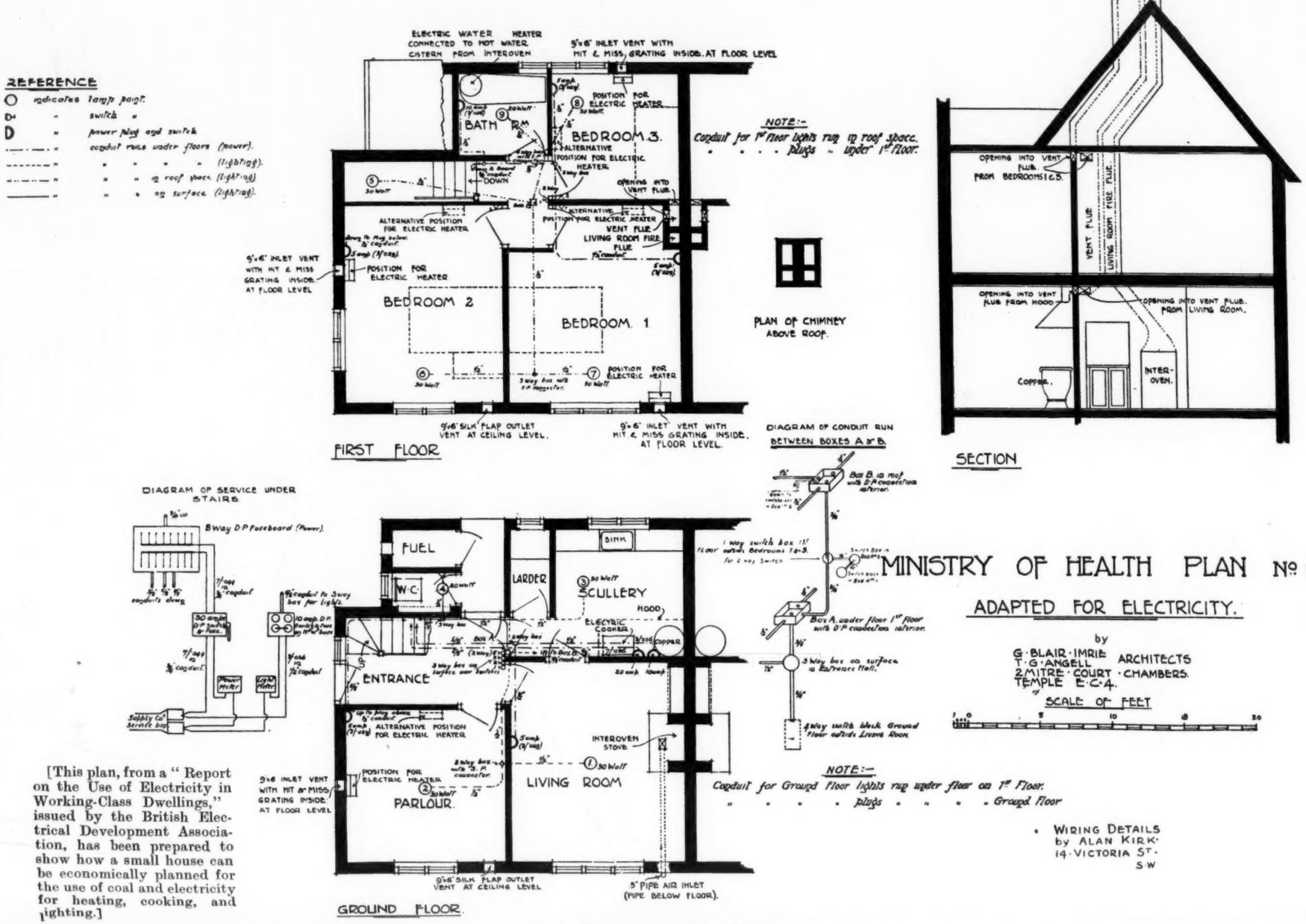
We refer to the case because it is often not realised how important the answers to the questions in a proposal form may be. In most cases, the answers form the basis of the contract, and in many the particulars are given in a form amounting to a warranty. If the particulars are not warranted, an inquiry, as stated above, can be made as to their materiality, but even so it is difficult to determine the materiality or immateriality of a fact. Thus, in the case in question, although the warranty made it unnecessary to inquire into the materiality of the fact suppressed, from observations which occurred in the judgment it would appear that the fact would have been held material, for it is stated that "it is no wonder the Company made this the basis of the contract, because insurance companies might hesitate long before entering into a contract with an insurer who had been a claimant upon companies, and they would be put upon their inquiry as to the nature and circumstances attending former claims and the importance of the question might be increased by the number of claims already made."

As regards the questions, it was laid down that, as they are framed by the insurer, if an answer is obtained which, upon a fair construction of the question, is a true answer, it is not open to the company to maintain that the question was put in a sense different from or more comprehensive than was covered by the answer; and where an ambiguity exists, the contract must stand if an answer has been made to the question on a fair and reasonable construction of the question. But a fair and reasonable construction must likewise be placed upon the answer given. Applying these principles, the Privy Council decided that the answer, although in an extremely literal sense it might be taken as correct, was not true. In other words, the answer seems to have been the truth, but not the "whole truth" as required by the question, a fair construction being placed upon both question and answer.

MINISTRY OF HEALTH PLAN No. 178.

ADAPTED FOR ELECTRICITY.

by
G. BLAIR IMRIE ARCHITECTS
T. G. ANGELL
2 MITRE COURT CHAMBERS.
TEMPLE E.C.4.


REFERENCE
indicates lamp point.
switch "
power plug and switch
conduit runs under floors (power).
" " " " (lighting).
" " " on roof space (lighting).
" " " on surface (lighting).
ELECTRIC WATER HEATER CONNECTED TO HOT WATER CISTERN FROM INTEROVEN
9"x6" INLET VENT WITH HIT & MISS GRATING INSIDE. AT FLOOR LEVEL
BATH RM
BEDROOM 3.
POSITION FOR ELECTRIC HEATER
ALTERNATIVE POSITION FOR ELECTRIC HEATER
OPENING INTO VENT FLUE
VENT FLUE
LIVING ROOM FIRE FLUE
ALTERNATIVE POSITION FOR ELECTRIC HEATER
9"x6" INLET VENT WITH HIT & MISS GRATING INSIDE. AT FLOOR LEVEL
POSITION FOR ELECTRIC HEATER
BEDROOM 2
BEDROOM. 1
9"x6" SILK FLAP OUTLET VENT AT CEILING LEVEL.
9"x6" INLET VENT WITH HIT & MISS GRATING INSIDE. AT FLOOR LEVEL.
FIRST FLOOR
NOTE:-
Conduit for 1st floor lights run in roof space.
" " " plugs " under 1st Floor.
PLAN OF CHIMNEY ABOVE ROOF.
OPENING INTO VENT FLUE FROM BEDROOMS 1 & 3.
VENT FLUE
LIVING ROOM FIRE FLUE
OPENING INTO VENT FLUE FROM HOOD
OPENING INTO VENT FLUE FROM LIVING ROOM.
COPPER.
INTER-OVEN.
SECTION
DIAGRAM OF SERVICE UNDER STAIRS.
8 way D.P Fuseboard (Power).
30 amp D.P switch at Meter.
10 amp D.P switch at Meter.
Power Meter
Light Meter
Scribbly Co's Service Box
DIAGRAM OF CONDUIT RUN BETWEEN BOXES A & B.
Box B. in roof with D.P connection to Interior.
1 way switch box 1st floor outside Bedrooms 1 & 3. for 2 way Switch
Box A. under floor 1st Floor with D.P connection to Interior.
3 way box on surface in Entrance Hall.
1 way switch block Ground Floor outside Living Room.
FUEL
W.C.
LARDER
SINK
SCULLERY
HOOD
ELECTRIC COOKER
COPPER
ENTRANCE
INTEROVEN STOVE
LIVING ROOM
PARLOUR.
9"x6" INLET VENT WITH HIT & MISS GRATING INSIDE. AT FLOOR LEVEL
POSITION FOR ELECTRIC HEATER
ALTERNATIVE POSITION FOR ELECTRIC HEATER
9"x6" SILK FLAP OUTLET VENT AT CEILING LEVEL.
5" PIPE AIR INLET (PIPE BELOW FLOOR).
GROUND FLOOR.
NOTE:-
Conduit for Ground Floor lights run under floor on 1st Floor.
" " " plugs " " " Ground Floor
SCALE OF FEET
0 5 10 15 20

[This plan, from a "Report on the Use of Electricity in Working-Class Dwellings," issued by the British Electrical Development Association, has been prepared to show how a small house can be economically planned for the use of coal and electricity for heating, cooking, and lighting.]

* WIRING DETAILS by ALAN KIRK. 14. VICTORIA ST. S.W.

HEATING AND VENTILATING.

ELECTRIC WIRING SYSTEMS.

By " M.I.E.E."

ONE of the most interesting questions at the moment in connection with electrical installations relates to the wiring of small houses: How can the cost be cheapened, without detriment to the safety and efficiency of the installation? Many attempts have been made to solve this problem, and it may be worth while to take a broad view of the subject and consider whither present-day practice is leading us.

All kinds of wiring can be classified under two heads: those in which the insulated wires are encased in metal, and those in which they are not so enclosed. This distinction involves quite different treatment of the two classes in the recognised wiring rules (not regulations—with very few exceptions, the so-called " regulations " of supply authorities are not backed by any statutory authority), for all metal-cased systems must have their sheathing metallically continuous and efficiently earthed, whereas no such stipulation applies to the other class.

Chief among the metal-cased systems is the method of enclosing the wiring in steel conduits, which is standard for all high-class jobs, and is efficient when properly executed, but costly. On the other hand, the chief example of the class which is not enclosed in metal is wiring in wood casing, which is almost the oldest method of wiring and has proved its worth during the past forty years, but is nowadays as costly as steel conduit.

Both of these systems are primarily to protect the wiring, but steel conduit is the only one which can truly claim to afford efficient protection, and even this is not invulnerable; if steel tubing is laid close behind a board it is easy to drive nails through the board and conduit too. As for wood casing, the mechanical protection that it affords is largely illusory; not only is it obviously not nail-proof, but it actually invites the driving of nails into it when laid on walls. As an electrical protection it is not regarded at all; indeed, if a fault occurs in wood-casing in a damp situation it is actually a source of danger, as the damp wood may be charred and ignited with a small leakage current which does not blow the fuses. Nevertheless, wood-casing has done splendid service, and should not be lightly esteemed. Especially we may point out that as it is not a genuine mechanical protection, and is never laid under plaster, it has demonstrated that electrical wiring does not need such " protection " at all, any more than a compo gas pipe does. This point is further emphasised by the fact that on the Continent and in the United States thousands of houses are wired with insulated conductors mounted on insulators, but completely exposed to view—a system which has as long and good a record as wood-casing itself.

Now, both steel conduit and wood-casing are ruled out for small houses by their costliness. Instead, a host of " systems " of wiring has sprung up, which all involve the installation of the wiring on the surface of walls, &c., as opposed to burying under plaster. This method of wiring has gained general acceptance, and when efficiently carried out it makes a very satisfactory job. The great popularity of the surface-wiring system has led to the production of numerous " patented systems " by cable-manufacturing firms, all on very similar lines; it has been suggested that it would be well if the makers would agree to adopt a single standard system, and there is much to be said for this proposal.

The essential difference between this class of wiring and the conduit and wood-casing system lies in this—that in these the casing is separate from the insulated wire, whereas in the surface-wiring systems the insulated wires are always integral with and inseparable from their outer covering. In the metal-cased class we find copper and lead used for the sheathing, permanently wrapped or drawn upon the insulating jacket. While copper has some claim to be regarded as affording substantial protection to the insulated conductors, the lead alloy which is most generally used for the sheathing is no stronger than a compo gas pipe, and can easily be perforated by nails or gnawed by rats. But both copper and lead have this in common—they are necessarily subject to the rule that the metallic covering must be continuous and must be earthed. Thus they share the disadvantage under which steel conduit labours, while they do not possess its merit, namely, that of affording sound mechanical protection to the insulated conductors. It is for this reason (*i.e.*, to effect the earthing) that the various " systems " have been developed—to provide a simple means of bonding the sheathing together wherever it has been cut for making joints or for outlets, and thus to render the sheathing metallically continuous with the mimimum labour and material. If earthing were not required, all these systems would lose their *raison d'être*, and wiring would be simplified.

What is the alternative? Obviously, " uncased wiring," as it is called in the I.E.E. Rules. This falls under three heads: Insulated conductors supported by cleats or insulators; flexible conductors; and insulated conductors protected with tough rubber compound. Of these, the first, though used abroad, is rarely tolerated for house wiring in this country; the same applies to flexible conductors, which are further subject to certain restrictions in the I.E.E. Wiring Rules; and there remains only the tough rubber compound protection, which, provided that it fulfils certain requirements in respect of quality, is absolutely free from all restrictions. This has, of course, the great advantage that it is immune from earthing regulations, and thus requires no bonding or other special fittings, while it can be laid in any position where metal-cased wires could be used, and some where they could not. It is water-proof, and can be laid under plaster with safety; it is extremely flexible, and no more obtrusive than lead-sheathed wires. It is not as easily perforated with nails as wood-casing, nor is it readily damaged by blows. It is not easy to install it as neatly as metal-cased wires, because of its greater flexibility, which allows it to sag between the supports on horizontal runs unless closely cleated; and it should never be installed with sharp bends. Properly erected, however, it appears to be admirably adapted for the surface wiring of houses, and is entirely free from all the complications imposed upon any metal-cased system of wiring.

The Wiring Rules of the Institution of Electrical Engineers, which are the recognised standards for this country, are in process of revision, and it is anticipated that their stringency will be relaxed so far as is compatible with safety and efficiency; with respect to the " tough-rubber-compound-protected " type, further relaxation is hardly possible, for there is not a single restriction regarding its use in the existing code. The *Electrical Contractor* recently remarked: " The field is still open for a novel system of wiring which will be free from the costliness and complications of the present systems." We have endeavoured to show in this article that the complications arise mainly from the necessity for earthing a metal casing, and that in order to attain simplification this must be avoided; thereby, also, the cost will be reduced. Labour costs, which often constitute more than half the total, can be minimised by systematising the operations involved and reducing them to " repetition work," as has been demonstrated in connection with the housing schemes. The cost of the special cables, however, is considerable, and is probably a serious obstacle to the more general adoption of the uncased wiring system. If this could be reduced, or if some other and cheaper method of protecting the wiring without the use of a metal casing could be devised, the cost of wiring houses would cease to hamper the progress of electric lighting.

GENERAL SYSTEMS OF CENTRAL HEATING.

THE central heating branch of engineering is to-day more than ever important, owing to the prevailing high cost of fuel, material, and labour respectively. The high cost of all branches of building has seriously increased the difficulties of the architect in preparing estimates for large building works. Naturally, his first object is to obtain a fine elevation and a good plan; he must conform to the local by-laws, and the sanitary authority cannot be ignored. Heating and ventilating are apt to be treated as quite unimportant subjects and to suffer accordingly. Often quite inadequate sums are put in the estimates to cover the engineering services, and after the drawings have been completed plans are sent out to several heating contractors, the lowest tender is almost invariably accepted, irrespective of efficiency, and then when the system is put to work maintenance will probably be found to have been ignored.

If serious consideration is given to building and substantial and thick walls provided with sealed air-spaces, as well as a certain amount of double glazing and well-protected roofing, the total heat losses can be reduced by a considerable percentage; so much so, that the increased cost of the above suggestions would soon be returned. It is suggested that the architect should employ a qualified heating engineer in whom he has confidence to prepare a scheme and specification according to the special nature of the building and general requirements. The particulars could then be issued for tenders, &c., all contractors thus being on the one level and tendering for the same work.

In regard to the various systems of heating to be adopted, these are many and varied, and can be condensed to the following:—

STEAM (LOW-PRESSURE OR EXHAUST).—The architect in selecting a system would take the nature of his building into consideration. If a large institution, as, for instance, an asylum or infirmary, where a number of buildings are placed on one site, he would require steam power for generating light, for laundry machinery, pumping plants, &c. The whole of the exhaust steam from these sources should be collected and used as a heating medium supplemented by make-up live steam, passing through a calorifier for heating the water required for heating and hot-water services to the entire institution. This apparatus should be centrally arranged, and the contour of the site taken into consideration for levels, &c., as the hot water would have to be mechanically circulated through ducts in the grounds of the institution and distributed to the various buildings, supplying radiators and points for hot-water service. By this system all condensed steam would be returned to the boilers and re-used for boiler feed, also, being distilled, would be valuable in keeping the general plant in good order. With all the mains in ducts, and heated surfaces (not used for radiating purposes) well covered with non-conducting material, there would be practically no loss of heat, and from a system as suggested the utmost economy would be obtained. It will be noted from these remarks that there is no direct steam heating, all the radiation being by hot water heated in the calorifiers.

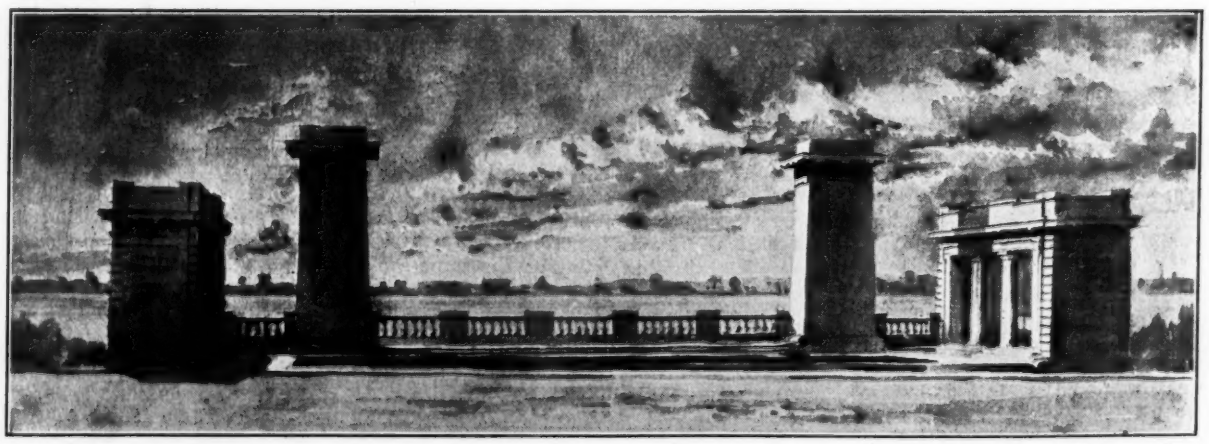
LOW-PRESSURE STEAM.—The low-pressure steam system, as used for small installations, can be adopted for large open works, where the operatives are active in their employment, and where the ventilation is good. Steam, on account of its high temperature, is not to be recommended for offices and general living apartments, as the highly-heated surface dries the air, removing all humidity, and generally creates a feeling of sleepiness and lassitude.

HIGH-PRESSURE HOT WATER.—This system is an old patent, having been introduced about 1830, and is better known as the "Perkin's system." It has been largely used in the past with success, but owing to its high temperature (averaging 350 deg. F.) has not been so largely used in recent years. For drying rooms, enamelling stoves, raising the temperature of water supply, liquor vats, &c., it is excellent, and for buildings such as churches and large halls, where the heat must be raised in a few hours, it still finds general favour. The writer, who has had considerable experience with this system, would employ it in a combined high- and low-pressure apparatus, *i.e.*, use the high-pressure pipes to raise the temperature in the low-pressure apparatus, the two systems being entirely distinct; this course, however, has not been developed.

LOW-PRESSURE HOT WATER (GRAVITY).—This system is universally employed to-day for office blocks, churches, schools, works, residences, and general business premises, &c. Heating by this system allows of a natural and humid atmosphere, the temperature of the heated surface averaging 150 deg. F. only. This temperature does not scorch the air as in the case of steam and high-pressure hot water. Its success, however, depends on the good designing of installations. The elements of gravity circulation, *i.e.*, that in applying heat to water the hottest rises to the top and the coolest falls to the bottom, is not always fully appreciated. The rising main "flows" should be taken as direct as possible to the highest point of the system, and all radiators and general heating surfaces attached to the return mains. By this arrangement a better distribution of heat, increased efficiency, and velocity in circulation, are obtained. Where radiators and heating surfaces are placed on the rising flow mains, partial and often entire obstruction of circulation result. Again, on most buildings, particularly schools, the boiler is fixed in the centre of the building, and this is correct where possible; but "flow" circulations radiate either way to extreme points, feeding radiators on their way, the result being that radiators in the warmest and most sheltered part of the building are hottest, and at the extreme points, where there are often two or three exposures, the radiators are the coolest. The reverse should be the case. In fact, for large blocks of buildings the heated water should be taken direct to the top floors, branching and returning and serving radiators floor by floor to the basement.

ACCELERATED SYSTEMS.—There is and has been in the past few years a number of automatically-accelerated systems introduced. In an installation of low-pressure hot water of over 500,000 B.T.U. capacity "positive acceleration" is recommended, *i.e.*, attached to the return of the system a direct-driven electrical centrifugal pump is fixed; the suction is from the return circulations, and the delivery through boilers. By this arrangement the whole installation can be kept at a more even temperature, the heat distribution is better, and considerably higher efficiency is obtained, the saving in fuel exceeding the cost of electric current. The difference in temperature of flow and return to boiler can be arranged to be about 15 deg. F. If the system is not accelerated the temperature, even with a well-designed installation, will be 30 to 40 deg. F. When accelerated apparatus is adopted there should be a by-pass connection so arranged that the system can be worked either by gravity or acceleration. A further benefit is obtained, *viz.*, heat can be more readily raised and distributed in the early morning after the apparatus has been partially shut down through the night.

PLENUM HEATING.—This system is extensively used for large workshops and over scattered areas, the heating medium being sectional heating (convoluted) stoves, over which the external air is drawn by fans and distributed by overhead ducts through the shops. If steam is available (and more especially exhaust), it is preferable to the hot-air stove, which, as a rule, is cast iron, and, heated to a high temperature, burns the air at the same time, removing all humidity. If high-pressure or exhaust steam can be used, batteries of steam pipes would be a better substitute for heating purposes. The external air is drawn in, heated, and distributed throughout the building; if the internal air is fairly good about one-third can be re-circulated. The air forced into buildings is allowed to exhaust itself through doors, windows, ventilators, &c. If the plenum system is applied to large blocks of buildings the design and scheme requires very special attention



Central Queensland War Memorial Competition. First Premiated Design, by MR. GEORGE R. BRYCE.

[The conditions of this competition required that this memorial should form an approach to a bridge which may be built across the Fitzroy River, Rockhampton, the building to allow the passage of traffic, and sufficient space had to be provided for the inscription of 7,000 names. Pending the construction of the bridge the memorial buildings are shown around a forecourt with centre of grass and possibly a few trees. The two pylons, 60 ft. apart, will eventually mark the end of the bridge. The two loggias, in which are placed the marble tablets with the names of men who served, close the ends of the forecourt, which in length corresponds to the width of Denham-street (99 ft.)].

and must be considered before the building is started to allow of all fresh-air and warm-air ducts being allowed for in the structure. It is generally considered good practice to pump two-thirds of air into the various apartments and extract one-third, thus forming a pressure, the extract being an entirely separate system.

In connection with this system, for a first-class installation the incoming air should be passed through a washing screen and thoroughly cleansed of all impurities. Special air washers are made, which not only clean the air but cool it in summer time when the heat is not required: a building can be kept very pure and cool by this method. The writer has designed and installed a system of plenum heating, partially warming and tempering the incoming air, but for the main heating a supplementary low-pressure hot-water system with radiators has been included, and this arrangement, if cost will allow, is highly efficient and most satisfactory.

BOILERS, TESTS, &C.—Very careful attention should be given to the allocation of boilers when preparing a scheme on any system. Boiler makers state that their product will heat so many square feet of heating surface, or give its B.T.U. capacity. Their figures are in most instances correct, but their tests are made under most favourable conditions, *i.e.*, evaporative tests under strong draught at works. It is quite another matter when an engineer has to select a boiler to work an apparatus that is spread over a flat area where the circulation is likely to be slow, and he will find that unless he allows a 20 or 25 per cent. margin he will be in difficulties on his final test. The engineer will also find himself very much on the short side if he estimates a given boiler on its stated capacity to heat a specified number of square feet of heating surface (radiators, pipes, &c.). He must take out the actual transmission and temperature difference to arrive at the total capacity both on exposed pipes and radiators.

BOILER COVERING.—In all systems mains and boilers should be covered with efficient non-conducting material to conserve the heat and ensure economical fuel consumption.

CHIMNEY FLUES.—Here again we have a most vital part of the system to consider. If the capacity of the apparatus is a certain figure, to obtain that result a proportionate amount of fuel must be consumed. Independent of velocity the chimney must be of sufficient area to carry away the products of combustion, it should be as straight as possible, and carried well up into clear windage or clear of adjoining buildings, otherwise down-draught will result, which may reduce a system to total inefficiency.

TESTING HEATING SYSTEMS.—The testing of heating systems is where trouble often starts. Presuming the engineer has designed and figured a system on a 30 deg. F. rise, he does not always obtain the conditions desired, that is, 30 deg. F. outside to enable him to obtain his inside temperature of 60 deg. F. Equivalent temperatures to that of 60 deg., when 30 deg. F., may be taken as follows:—

External	25°	30°	35°	40°	45°
Internal	57°	60°	62°	65°	67°

The restrictions in connection with the above are such that in the opinion of many they are neither fair to engineer or client; therefore, it becomes more a matter of satisfying the client at completion of the system, taking into consideration the conditions prevailing. The writer has invariably found that when on a test he was satisfied the client was likewise, and no installation concerning which there is any doubt should be left in an unsatisfactory state.

APPROXIMATE COST OF INSTALLATIONS.—It is a difficult matter to arrive at an approximate cost of heating systems, as buildings vary to a large extent. However, the following is based on recently completed contracts and prices prevailing to-day:—

Residences ..	£10 0	per 1,000 cubic ft.
Office blocks ..	7 10	,, ,,
Church halls, &c.	4 10	,, ,,
Works	4 10	,, ,,

The above prices are exclusive of the usual builders' attendance on engineers, painting, &c.

W. P. S. K.

DOMESTIC HEATING.

THE following is an abstract of a paper, entitled "The Use of Open Fires for Domestic Heating," read by Dr. Margaret White Fishenden, D.Sc., of the Manchester Air Pollution Board, before a recent meeting of the Royal Sanitary Institute:—

The results of recent experimental investigations have shown that the open-fire throws out some 20 to 25 per cent. of the total energy of combustion of the coal burned as radiation into the room, the amount in general varying comparatively little with the design of grate employed, unless there is a boiler at the back of the grate, when the indication is considerably diminished. Modern gas-fires give as much as 40 or 45 per cent of the heat of combustion of the gas as radiation, and electric heaters an amount which varies over wide limits with the type of heater employed, but which has been stated on good authority to rise in some cases as high as 60 per cent. of the energy of the current consumed. The air heating produced by coal or gas fires is relatively insignificant, and the overall efficiencies, *i.e.*, the sum of radiation and air heating, may be reasonably computed as about 30 per cent. for coal-fires and 60 per cent. for gas-fires. The overall efficiency of the electric heater, of whatever type, unless placed under a flue, may be assumed to approach 100 per cent.

When a pound of coal is completely burned it gives out always a definite amount of heat, in the case of high grade house-coal generally about 14,000 British Thermal Units of heat. Similarly, the complete combustion of one cubic foot of gas of uniform quality produces always the same amount of heat when burned, about 500 B. Th. U. per cubic foot; whilst the heat equivalent of one Board of Trade unit of electricity is 3,400 B. Th. U.

Adopting the above efficiency figures, the relative costs of coal, gas and electricity as heating agents may readily be calculated. With coal at 60s. per ton, gas at 4s. per thousand cubic feet, and electricity at 1d. per B. Th. U., it follows that the number of B. Th. U. produced by the burning of a pennyworth of coal is about 43,500; from a pennyworth of gas 10,400; and from a pennyworth of electricity 3,400. But, taking these figures in conjunction with the efficiency figures quoted above, it is found that of the 43,500 B. Th. U. from the coal only 30 per cent., or some 13,000, are used in warming the room; of the 10,400 B. Th. U. from the gas, 60 per cent., or about 6,200 B. Th. U.; and of the 3,400 B. Th. U. from the electricity all are used for heating the room. That is to say, for continuous heating, and taking into consideration no other factors, coal at 60s. per ton costs only about half as much as gas at 4s. per thousand, or one-quarter as much as electricity at 1d. per unit.

The problem, however, may be regarded from other points of view than that of the householder's pocket, and it is interesting to compare the heating values of the fuels upon initial coal-consumption. It takes, even in well-equipped generating stations, at least three pounds of coal to produce one unit of electricity; and the fact that the whole of this is utilised for heating purposes still means that only 3,400 B. Th. U. are received in the room in place of 30 per cent. of 42,000 B. Th. U., or 12,600 B. Th. U., which would have been received from the original coal if burned in an open grate. That is to say, by turning the coal into electricity the useful heat is reduced to little more than a quarter. Compared on this basis a better case is shown for gas. One ton of coal when carbonised by ordinary gas-practice yields, say, 13 cwts. of coke and 12,000 cubic feet of gas of 500 B. Th. U. per cubic foot calorific value. We have experimental support for the assumption that the heating value of the coke is about equal to that of its own weight of coal; we may assume, therefore, that it took 7 cwts. of coal, plus about 2 cwts. of coke used for carbonising purposes, to produce the resulting 12,000 cubic feet of gas, that is, nearly 12 cubic feet per pound of coal. Taking 30 per cent. efficiency for coal fires and 60 per cent. efficiency for gas fires, it follows that the gas gives nearly as much heat as the coal used in its production. But both gas fires and electric radiators have obvious advantages over coal fires; they can be lighted at once, turned on or off at will, and rapidly reach their maximum heating effect. Further, they are clean and smokeless. Coal fires, on the other hand, are troublesome to light, take a long time to reach a high radiation value, involve additional work in the cleaning of flues and grates, and frequently involve waste in the throwing away of cinders.

Notwithstanding these facts, it appears unlikely that either gas or electricity, owing to the greater cost, can at present displace the open coal-fire from its popularity unless legislation is brought to bear upon the matter. For rooms which are used intermittently gas-fires may generally, or even electric fires sometimes, be more suitable than coal; but for continuous heating, both, and especially the latter, are out of the question where economy is a matter of moment. Moreover, coke is a fuel which burns practically without smoke, and which, when reasonably dry, may in many cases be used with advantage for domestic purposes. The radiation emitted is, for a good quality coke, as great weight for weight as from coal. There still remains, also, the possibility of the introduction of low-temperature cokes, so called because they are yielded by the carbonisation of coal at comparatively low temperatures. These cokes are easily lighted and produce a bright, hot, and pleasant fire even with indifferent draughts, and are smokeless. They probably give higher efficiencies than any other solid fuel. The production of this fuel can scarcely yet be regarded as a commercial proposition, but the problem is receiving attention, and upon its development the hopes of many smoke-reformers are largely based.

The questions involved in the heating of rooms by open fires are, however, very intricate, and mere measurements of radiant efficiency and air-heating are by no means the end of the story. The inquiry is complicated by the fact that the human body must be maintained at a temperature of about 98 deg. F., which is, even for warm rooms, much above air-temperature. The cooling effect of draughts, in addition to the direct effect of radiation, must, therefore, be taken into account, and particularly is this of importance in dealing with coal fires, which commonly draw so large a volume of air through a room. Gas fires generally draw less air through a room than coal-fires, but still modern gas fires cause a very considerable air-flow, which, however, is usually counted as an advantage as it ensures the removal of all the products of combustion by way of the flue. Electric fires cause a relatively feeble air-circulation, probably not consistent with hygienic conditions, though, of course, an electric heater could be placed under a flue, when increased ventilation would be assured, though at the cost of a part of the heating efficiency. These facts give rise to rather conflicting considerations, for while it is of the greatest importance that a room should be adequately ventilated it must be remembered that the stronger and colder the draughts which sweep over one's body the more will be the radiation required to produce an impression of warmth.

It is essential that open fires should be provided with means of draught regulation, both by a damper in the flue above the fire and by an adjustable fender to regulate the amount of air entering the fire from below; in this way the total amount of air drawn through the room and the rate of burning of the fire can be separately adjusted. But, generally speaking, on account of large draughts associated with coal fires, these must give more radiation than gas fires, and especially than electric radiators, in order so produce an impression of equal warmth.

GASEOUS FUEL AS AN AID TO SMOKE ABATEMENT.

FOR many years past leaders of the medical profession—especially those occupying the position of Medical Officer of Health—and such students of the public weal as the Smoke Abatement Society, have been pointing out the evil effects upon the public health of consuming raw coal in our houses and factories, more especially as regards large towns, where perforce many buildings are crowded together, each one pouring forth its quantum of smoke into the atmosphere. Attention has repeatedly been drawn to the fact that while the consumption of gas as a fuel for cooking, heating, water heating, and the many other purposes for which it is used in houses and shops, and for numerous industrial processes in factories, has increased enormously in the past twenty years, the autumn and winter fogs which had hitherto been so prevalent in large cities and towns—London, for instance—had steadily decreased both in number and density during the same period. It took, however, the coal stoppage conclusively to prove that those statements were correct, as the public health materially improved in large cities and towns as a direct result of the enforced cessation of the use of raw coal as a fuel.

That there is no doubt about the noticeable improvement in the public health owing to the causes set out herein was clearly shown by the statement recently issued by the Medical Officer of Health for the County of London to the effect that the lowest death-rate on record had been registered. The death-rate in Glasgow during the strike was the lowest since the early 'nineties. For the second quarter of the year the death-rate was 13.0 per 1,000, a reduction of 2.5 on the corresponding quarter of last year, and of 3.6 on the first quarter of this year. About one-half of the reduction, stated Dr. Chalmers, the Medical Officer of Health, was due to the smaller number of deaths from diseases of the respiratory organs.

Dr. J. S. Owens, who has been carrying out exhaustive experiments to ascertain the degree of impurity in London's atmosphere, has calculated that house chimneys in London emit 200 tons of soot in three hours on a winter morning. The British Association at this year's meeting also referred to the lessons learned in this direction owing to the coal stoppage, and Sir Napier Shaw, F.R.S., Chairman of the Advisory Committee on Atmospheric Pollution, suggested in the Press that it would be in the interest of the community that the local rates should be eased for houses which made no smoke.

Conserving the By-products from Coal.

Smoke abatement, however, is not the only factor in favour of the use of gas as a fuel in future. In his presidential address to the Institution of Mining Engineers this year, Sir John Cadman pointed out the value of the by-products which are destroyed when raw coal is consumed. He said about a sixth of all the coal used in Great Britain was burned, and, of course, largely wasted, in the ten million private dwellings. The air of London had been found to deposit 34.71 tons of impurities per square mile per month, whereas in the open country near Malvern the average total monthly deposit was only 6.63 tons. He asked whether it was a wise dispensation under which at least three-fourths of our coal was used directly without any effort to conserve the by-products. "A very few years," he said, "may see it a penal offence to burn raw coal in any of our towns. While the popular view of coal is that it is something to be burned, the scientific view is tending to be precisely the opposite. It is that coal is too valuable to be burned, that to burn it is to squander it, that the by-products of coal are of greater moment than the coal itself, and that not until these by-products have been extracted should the residuum be used for industrial or domestic purposes."

Heating in the Future.

Having in view all the foregoing, it is clear that we have arrived at the point when architects and builders will increasingly turn their attention to the installation of smokeless fuel-consuming appliances when dealing with the heating of new and reconstructed buildings. It is claimed that in most cases the extended use of gas as a fuel is the only practical and economic method which can be adopted in order both to perpetuate the hygienic conditions prevalent during the coal stoppage and to prevent the loss to the nation of those valuable by-products which is causing scientists so much anxiety.

One method of effecting the desired result which will undoubtedly be adopted is the installation of "built-in" gas fires with "economy" flues. This system of heating offers many advantages, in addition to smoke abatement, viz., reduction in building costs, saving of building materials, greater floor space on a given ground area, more rapid erection of houses, &c. An article which appeared in *The Builder* for September 24, 1915, first drew attention to the possibilities connected with this system, and it may be mentioned in passing that houses constructed on these lines are now being built in all directions, notably some thousands at Liverpool, in which case each house has "built-in" gas fires installed with "economy" flues and no chimney breasts in all rooms except one. It is understood also that in the Belgravia Hotel, London, now being reconstructed, about 250 gas fires are being installed in the bedrooms. As extra bedrooms have been constructed by dividing up and partitioning off a number of large rooms, it became necessary to provide ventilating shafts for the gas fires. This has been accomplished by the use of cast-concrete flue blocks of a similar type to those used for "built-in" gas fires. It will readily to realised that serious structural alterations would have been involved if coal grates had been chosen for heating the rooms. Gas cookers and gas water heaters will be installed in each of the 2,800 houses that are at present being erected by the London County Council on the Becontree Estate, as the nucleus of a new garden suburb. These houses will also be lighted by gas and many of them will have "built-in" gas fires.

Gas Central Heating Systems.

In most buildings to be erected of a residential type the "built-in" gas fire probably offers the best solution of the heating problem; therefore, it seems only when buildings of a larger character, such as very large residences, hospitals, large blocks of offices, &c., are under consideration that the central-heating system might be installed as an alternative or addition to the use of gas fires. Even in this field, however, hitherto closed to any other fuel than coke, the use of gas is beginning to extend.

We are probably only at the beginning of things in this respect, and for large central-heating installations the estimated cost of the gas consumption would usually have a deterrent effect on prospective consumers, but the details of some recent installations of quite appreciable magnitude given below will no doubt be of interest.

In a gas-fired low-pressure hot-water installation for warming offices in the West End of London the plant is installed for heating two upper floors, one containing register files and one occupied by typists. In view of the sedentary nature of the work carried on it is stipulated that a constant temperature of 63 deg. F. shall be maintained in the winter. The heating is carried out by two separate but similar installations, one on each floor. Fig 1 shows the general lay-out of the system on one of the floors, and Fig. 2 illustrates the two gas boilers which are fitted to provide the necessary heat for this floor. Two similar boilers are installed to heat the floor above.

The apparatus is fitted on the drop-system with the boilers at the same floor level, thus reducing the cutting away and making good to a minimum owing to the system on each floor being self-contained. This arrangement has the further advantage of preventing secondary heat losses, as the boiler units and all the mains provide valuable additional heating surface. As there is a fireplace in each room the products of combustion from the boilers are discharged into the flue of this in each case. The radiator plant consists of sixteen 45 in.-high two-column radiators of six loops each, containing collectively a net heating surface of 480 sq. ft. This is supplemented with 120 lineal ft. of 1½ in. main circuits in each section, which together with the branch connections and boiler surfaces represent a further 320 sq. ft. surface, totalling 800 sq. ft. of radiation equal to 400 sq. ft. on each of the two floors, which have a total cubical capacity of 29,676 ft. The building has a large proportion of heat-losing wall surface, as the two flank walls (some 55 ft. long each) are external, and there are 190 sq. ft. of glass on each floor, but notwithstanding these unfavourable conditions a regular temperature has been satisfactorily maintained through two winter seasons.

Ease of control is a special feature in this case, the regulation of each section of the plant being effected automatically by an air thermostat on each floor. This is fitted at the end of the room close to the boilers (Fig. 2), the gas supply to which is fed through and regulated by the thermostatic valve, which is actuated by the air temperature. This valve comes into operation if the room is becoming over-heated and it then automatically shuts down the gas to a degree

Fig. 1.—An Office Floor Heated by a Gas-fired Radiator System.

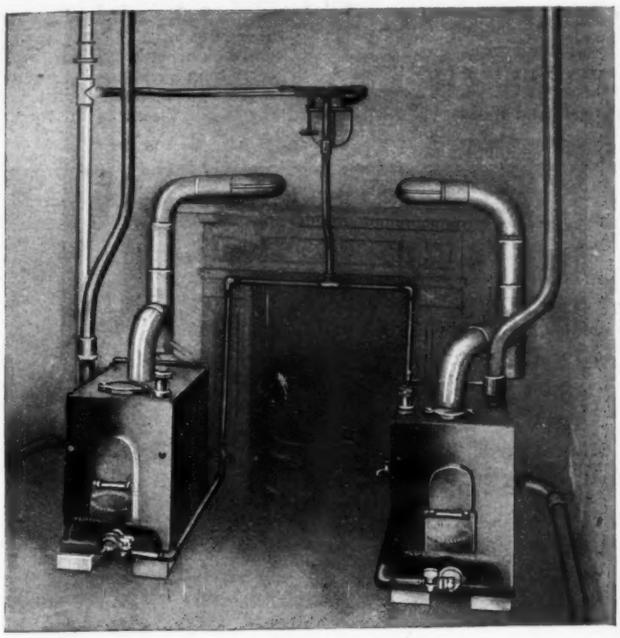


Fig 2.—Gas Boilers Heating the Radiating System shown in Fig. 1.

which prevents the temperature exceeding 63 deg. F., while at the same time reducing the fuel costs. If and when the room again cools down below the stipulated temperature the valve operates in the reverse direction, automatically increasing the gas supply until the desired 63 deg. F. is again reached.

The automatic action of the system, therefore, ensures that gas shall only be consumed in accordance with the actual requirements, while the boilers may be instantly shut off if they have been lighted when the outdoor temperature was low (say, first thing in the morning), but as the day has progressed has become milder.

A gas-fired low-pressure hot-water heating system is being installed at a large residence near Hyde Park, for the purpose of warming certain portions of the house; there is a large radiator of 60 sq. ft. heating surface in the hall on the ground floor providing general heat to the staircase, two radiators of 37½ sq. ft. surface each in the library, and single radiators of 42 sq. ft. and 34 sq. ft. in the bathrooms on the first and second floors respectively. The gas boilers are fixed in the kitchen beside the gas-heated apparatus for domestic supply, and are, therefore, under the immediate control of the staff.

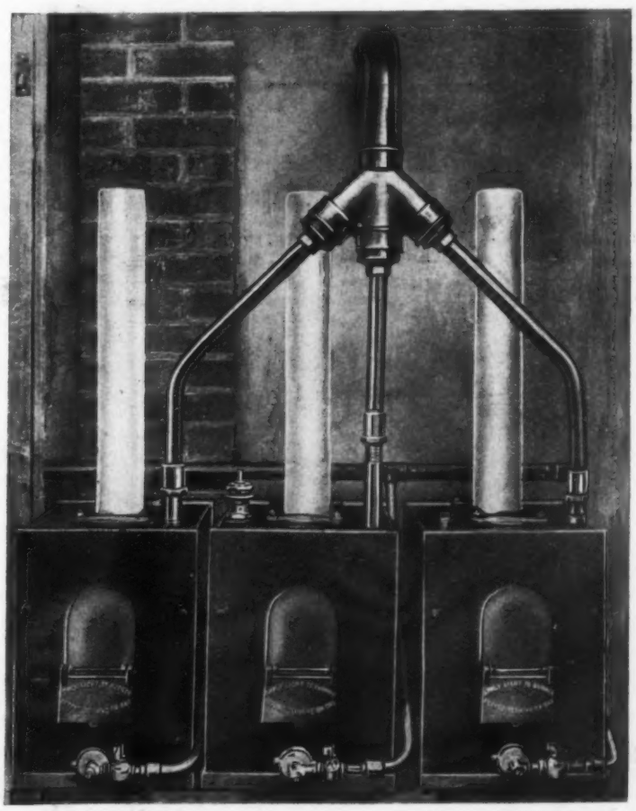
The total heating surface in radiators represents 211 sq. ft., apart from the mains which extend some 75 ft. run in the basement in 2 in. and 1½ in. wrot tube with vertical risers of 1 in. tube for the upper section. In all there are 250 lineal feet of piping utilised, representing 100 sq. ft. of heating surface. The whole of the piping in the basement, however, is lagged to avoid heat losses, which reduces the effective radiation surface of the pipe runs to the equivalent of 40 sq. ft., which, added to the radiators, makes a total radiating or heating surface of 250 sq. ft. There are two gas boilers being fitted capable of providing a total of 48,000 B.Th.U. per hour, i.e., 24,000 each boiler. This allows an ample margin of power for the required duty, as the maximum discharge from the total radiating surface is 40,000 B.Th.U. per hour calculated at the rate of 160 B.Th.U. per sq. ft.

The available surplus of power facilitates the quick heating up of the plant, but in order to govern the degree to which it is utilised and at the same time to economise in fuel costs one of the boilers is fitted with a water-type thermostatic valve which automatically reduces the gas consumption if and when any tendency to over-heating occurs. Apart from this advantage, however, regulation by hand will always be possible, as a hot-water thermometer is being fitted in the main circuit in the kitchen to indicate the temperature of the circulation, so that the staff will know when the gas may be turned down or even shut off altogether. Perfect regulation of the simplest character involving no labour but actuated either automatically or by the turn of a tap is thus ensured.

A gas-fired low-pressure hot-water heating system has been recently installed for an operating theatre in a nursing home in the Harley-street area. The room to be heated is built as an extension to the building, and it has a flat roof with a lantern light. These features and the nature of the requirements have rendered it necessary to provide heating surface beyond the amount which would usually be considered ample for the cubical capacity of the room, which is only 2,500 ft. Four radiators of the hospital type—hinged to swing out from the wall to allow adequate facilities for cleaning—are provided, each having a heating surface of 40 sq. ft., in addition to which a coil of 1¼ in. circulating pipe is fitted around the lantern light to prevent cold air descending upon the operating table. This installation provides every facility for meeting the intermittent and urgent demands which are so common a feature in operating theatres. Gas is especially suitable for such duty, because the theatre may rapidly be heated at any moment day or night, while the consumption of fuel may instantly be reduced or discontinued by the turn of a tap.

A gas-heated installation which has been working satisfactorily at a large residence in Epsom for the past two winters presents rather unusual but interesting features. The boiler is of the ordinary cast-iron sectional, solid-fuel type; it was originally installed and used as a solid fuel boiler, heating some twenty radiators varying in size from 30 to 60 sq. ft. of radiating surface. In order to dispense with the labour of stoking and clinkering the boiler and cleaning the flues, while at the same time providing a more easily-regulated system, it was decided to insert a group of high-power gas burners of a special type within the firebox of the boiler, so arranged as to give the greatest possible efficiency for the gas consumed. The fact that one or more of the burners can be immediately extinguished or relighted according to the temperature required permits the users to exercise the maximum of control combined with the minimum of fuel costs.

As the products of combustion from the gas are less in quantity and lighter and more vapourous in character than those from solid fuel the flue area required is now not so great as that originally provided to the boiler. The flue has, therefore, been carefully baffled to the correct degree necessary to deal with the maximum amount of products from the required consumption of gas.—C.



Battery of Gas-fired Boilers Heating Hot-water Radiators.

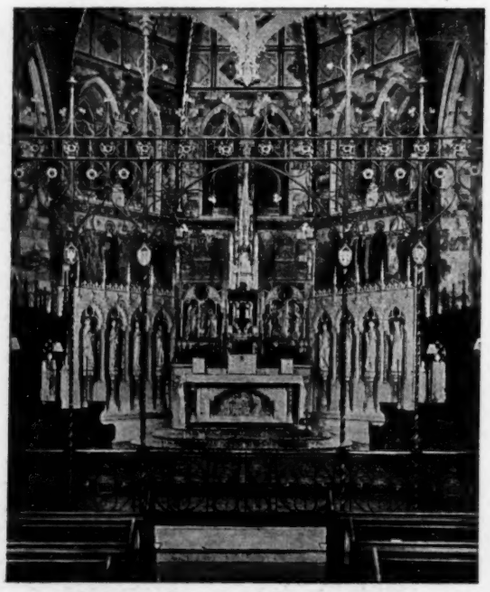
THE LIGHTING OF ST. MARIE'S CHURCH, RUGBY.

We illustrate on this page the new lighting installation at St. Marie's Church, Rugby. St. Marie's is a Roman Catholic church, of Gothic architecture. The walls are of a very light stone, relieved by a decorative design around and between the pointed arches. The roof timbering is blue, with silver stars painted upon it. Formerly the church was lighted by means of gas standards, which may be seen in the illustrations. They are not, however, used at all nowadays, and will shortly be removed.

The present installation at St. Marie's Church consists of trough reflectors containing 40 and 60 watt vacuum lamps. The nave is lighted by fourteen troughs. These reflectors are fixed on the east side of the arched roof beams, between the clerestory windows. With this disposition of the light units neither the lamps nor reflectors are visible to the congregation. The light comes from the same level as the windows, and, like the daylight, illuminates the entire cubic area of the nave, from floor to ceiling. There is ample illumination at pew height, and the congregation are able not only to read with ease but also to look towards the chancel without discomfort. The chancel is lighted by means of six troughs. Owing to the general eastward direction of all the lighting and the greater wattage employed in the chancel, the altar, reredos, and especially the rood cross, are more intensely illuminated than the body of the church; the lighting helps to focus the attention of the congregation upon these three features.

The illustrations were taken at night solely by the light of the new installation. The wiring, which is on the surface, is carried out on the Henley wiring system, with twin lead-covered cables painted to match their surroundings, and is practically invisible. Control of all points is centralised in a distribution-box fixed in the vestry.

The whole of the work was carried out by the Rugby Urban District Council Electricity Department, under the direction of Mr. T. S. Shenton, the Council's Electrical Engineer. The trough reflectors ("Mirolux") and lamps ("Mazda") are by the British Thomson-Houston Co., Ltd., of 77, Upper Thames-street, E.C.4.



Lighting of St. Marie's Church.

A CONFERENCE ON GAS.

The tenth annual conference of the British Commercial Gas Association was held at Glasgow on Tuesday and Wednesday last, under the presidency of Mr. D. Milne Watson, M.A., LL.B. (President of the National Gas Council).

The Science of Heating.

In a paper entitled "Gas in Relation to Hygiene and Smoke Abatement," Mr. John W. McLusky (Engineer and Manager, Glasgow Corporation Gas Department) dealt with the hygienic qualities of various forms of indoor artificial heating. The open coal fire, he said, gave out radiant heat and so did the modern gas fire; but the modern gas fire had the advantage over the coal fire in having a much greater regularity of heating. In addition it provided a glowing fire almost immediately after lighting, whereas the coal fire took a long time to "burn up" after first being lit. A gas fire, too, could be easily regulated, and the heat of the room controlled in a way which was not possible with coal fires. The coal fire, moreover, was a smoke-producer and a defiler of the atmosphere; the gas fire was, of course, smokeless.

Lighting of St. Marie's Church.

A properly-constructed gas stove, with a flue sufficiently large to carry away the products of combustion, although for constant use more costly than a coal fire, was quite as satisfactory from a hygienic point of view, and did not in any way vitiate the air of the room, nor did it produce any abnormal drying effect as was popularly supposed. It would carry off from 2,000 to 4,000 cubic feet of air per hour, which was a valuable ventilating effect, but one that did not entail the cutting draughts caused by a blazing coal fire. There could be no doubt that gas fires not only had no hygienic disadvantages over coal fires, but, on the contrary, had a marked superiority in that respect.

Industrial Uses of Coal Gas.

Mr. George Keillor (Engineer and Manager, Greenock Corporation Gas Department), in a paper on "Gaseous Fuel in the Shipbuilding World," quoted a number of instances where the cost of rivetting had been considerably reduced by the use of gas-heated rivet-heaters in this country and in America. In Glasgow, Greenock, Darlington and elsewhere, he said, the engineering and boiler-making industries were daily proving that by substituting gas furnaces for oil-heated or solid-fuel furnaces for rivet heating, they were actually reducing their costs for those processes by 50 per cent., while in Glasgow and elsewhere heavy forgings were being produced 51 per cent. cheaper when gas was used instead of solid fuel, and with a net increase of fully 10 per cent. in output. If those processes were being successfully applied outside the shipyard, there was nothing to prevent their being successfully applied inside the shipyard where they entered so largely into the cost of construction.

The advantages of "Carbotron" fuel and portable stoves for heating are fully set out in a leaflet issued by the manufacturers, Messrs. C. A. Peters, Ltd., of Derby. The fuel does not flame or emit smoke, and therefore no flue is required for outhouses, garages, &c., in which they are used. The stoves are so constructed that they can be moved about or stood on wooden flooring without danger from fire. When lighted and charged the stoves burn for from six to twelve hours without further attention, and the fuel leaves no ash.

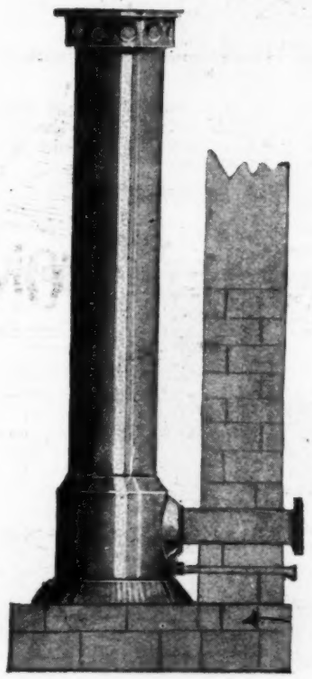
Messrs. J. T. Collier & Co. (Macclesfield) have issued a leaflet, illustrating and giving particulars and prices of a number of fittings for low-pressure hot-water and steam heating apparatus, domestic hot-water supply, baths, lavatories, smoke-consuming fire-bars for steam boilers, &c. The firm specialises in the manufacture of fittings for all types of heating apparatus, and has, we are informed, large stocks from which immediate delivery can be made.

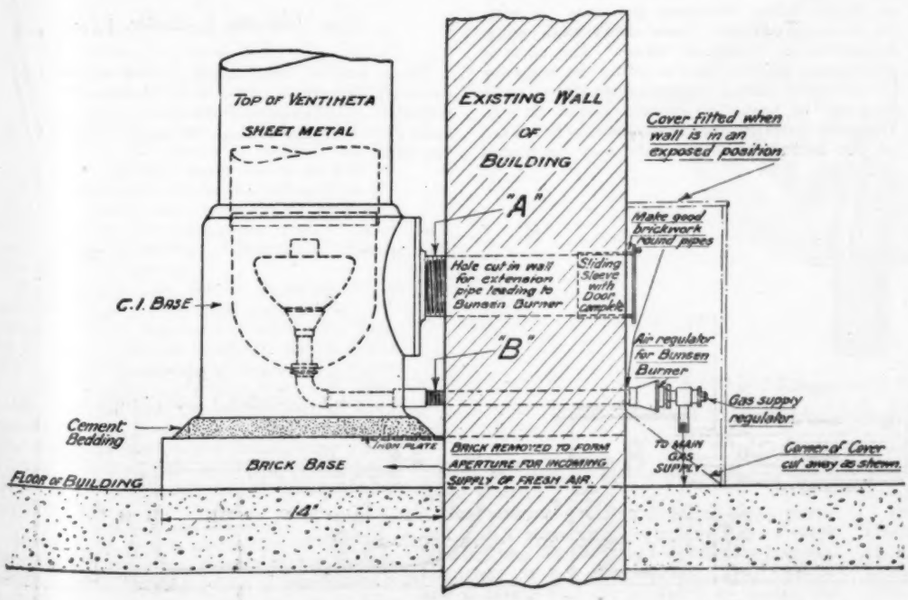
NEW HEATING APPARATUS.

On this and following pages we give descriptions and illustrations of new and improved heating apparatus and devices.

The "Ventiheta."

A new and improved type of "Ventiheta" has been put on the market by Messrs. Ventiheta (United Kingdom), Ltd., of 311, Old-street, E.C. 2. The apparatus, which is enclosed in a neat upright metal case, either round or square, serves the dual purpose of heating and ventilating a room or building; and as there are no fumes there is no necessity to provide a chimney or flue. The illustration on this page explains the principle on which the apparatus is designed. Fresh air is drawn in from outside to the bottom of the "Ventiheta," and on being heated finds its way into the room from the top. After leaving the apparatus the heated air rises and finds exits by way of crevices above doors and windows. Either gas, oil or electricity may be used for the heating medium. The advantage claimed for this method of heating is that cold air is not drawn into the room before being heated, thus causing cold draughts, but that a continuous flow of warmed air is brought in. Also, instead of a considerable part of the warmed air being wasted by passing up a flue, the whole is circulated in the room, thus giving 100 per cent. heating value for the fuel used, which can be regulated according to the heat required. As regards fuel consumption, it is claimed that from 5 to 10 cubic ft. of gas per hour is sufficient to maintain a temperature of 60 deg. Fahr. in a room of 2,040 cubic ft. when the outside temperature is 38 deg. There is also a considerable economy in building costs with this type of heating apparatus owing to the elimination of chimneys and fireplaces.

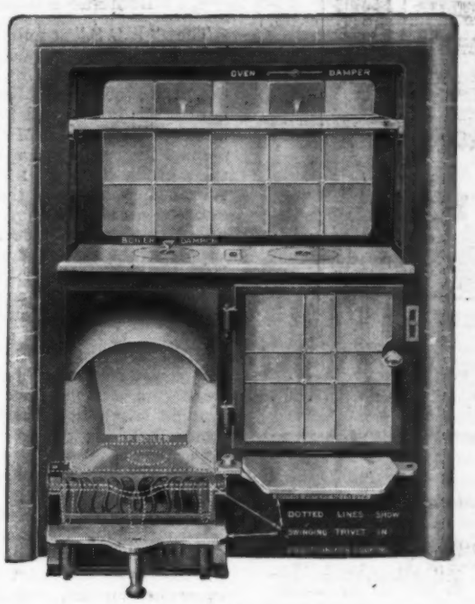



TOP OF VENTIHETA
SHEET METAL
EXISTING WALL OF BUILDING
"A"
Cover fitted when wall is in an exposed position
Make good brickwork round pipes
Hole cut in wall for extension pipe leading to Bunsen Burner
Sliding Sleeve with Door complete
C.I. BASE
"B"
Air regulator for Bunsen Burner
Gas supply regulator
Cement Bedding
IRON PLATE
BRICK REMOVED TO FORM APERTURE FOR INCOMING SUPPLY OF FRESH AIR
TO MAIN GAS SUPPLY
Corner of Cover cut away as shewn.
BRICK BASE
FLOOR OF BUILDING
14"

The "Ventibeta."

A Combination Range.

The patent "Foresight" low-fire oven and combination range, illustrated below, made by Messrs. Samuel Smith & Sons, Ltd., of Beehive Foundry, Smethwick, may be converted from a range to a grate by one simple operation. As a cooking range, its tiled oven door and tiled back, of a colour to harmonise with the tiles in the hearth and surround, give it a good appearance, and it is specially designed to be economical in fuel consumption. The use of tiles reduces the labour of cleaning to a minimum, and black-leading is eliminated altogether. The capacity of the boiler is such that hot water sufficient for two baths may be drawn off per hour. The swinging hot-plate is pivoted at one side of the grate, and can be adjusted to form either an open or closed fire; it is so shaped that when swung over the fire it fits closely to the fire-brick back and sides, thus shutting in the flame and concentrating the whole of the heat on the oven and boiler. A hearth trivet is hooked on to the hob-plate, making a spacious plate capable of holding three or four saucepans.



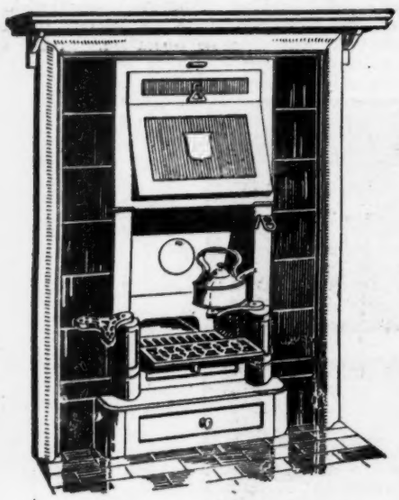
The "Foresight" Range.

To convert the range into a dining-room grate the hob-plate is swung in the opposite direction, and comes to rest under the projecting shelf at the back of the oven. When the plate is in this position the fire becomes a slow-combustion grate, with fall-bar fire.

A Convertible Stove.

The "Interoven" convertible stove and the "Bewty" barless fire-front (manufactured by the Interoven Stove Co., Ltd., of 156, Charing Cross-road, W.C.2) have now become very well known owing to their frequent use in housing schemes, including those of the London County Council, H.M. Office of Works, Messrs. Vickers, Ltd., and many of the housing schemes of local authorities. The feature of the "Interoven" stove is the ease and simplicity with which it can be converted from an efficient cooking range into an open firegrate. The new design illustrated below embodies all the principles of the earlier models with several improvements. The oven is large enough to bake joints of 12 lbs. weight, and the hot-plate will hold two 1-gallon and two 3-pint saucepans. The revolving trivets can be used when the stove is in use as a range or as a grate. The hot closet can also be used whether the stove is closed or open. The boiler is of exceptionally large capacity for this type of stove. The "Inter-

oven" is specially recommended for use in the conversion of houses into flats, as it only requires a 4 ft. chimney breast and, therefore, considerably reduces the cost of altering brickwork



The "Interoven" Stove.

to install a cooking range. A large variety of designs in tile surrounds may be inspected at the company's showrooms.

The "Bewty" fire-fronts, also manufactured

The "Bewty" Dog Grate.

by the Interoven Co., permit a well-spread, shallow fire to burn slowly under controlled draught, thereby giving the maximum heat for the fuel consumed. They are made in various sizes, and may be easily adapted to existing grates. The "Bewty Minor" is constructed on the same principle, but is a lighter pattern. The "Bewty" independent slow-combustion dog grate, illustrated herewith, is designed to replace old-fashioned dog-grates, and combines considerable fuel-saving and heat-radiating properties with a good appearance.

Domestic Hot-water Supply.

The "K.C.B." combination range, boiler, bath and hot-water system illustrated on this page (manufactured by the K.C.B. Foundry Co., Ltd., of 120B, Mount-street, W.1.) has been specially designed for installation in small houses. The range is of the portable type with a small fire. The range boiler is connected to the portable boiler by 1-in. galvanised flow and return pipes, and is of the open type, all steam escaping up the chimney. The portable boiler is of ten-gallon capacity. The cold-water supply to the system is automatic, the feed to both boiler and copper being regulated from a supply cistern. The advantages claimed for this system are as follows:—(1) The hot-water storage is directly in contact with the fire, which avoids loss of heat; (2) a plentiful supply of hot water can be obtained at the same time as the fire is in use for cooking, and no forced draught is required, thereby effecting a saving in the fuel bill; (3) no bulky cylinder or hot-water tank is required; (4) connecting pipes are eliminated between boiler and cylinder, hence cheapness in erection; (5) as there are no circulating pipes the possibility of corrosion or incrustation due to precipitation is practically nil, hence smaller main pipes may be used; (6) the range supplied with the system has an open cheerful fire fitted with a patent slow-combustion arrangement. The ashes receptacle is arranged so that no dust escapes into the room.

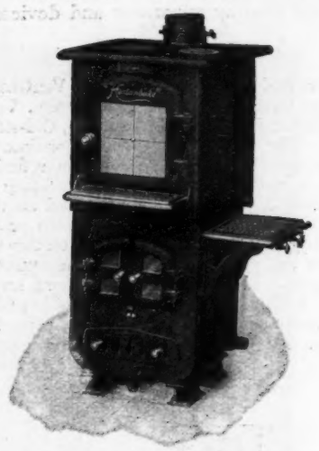
The firm has also put on the market a system on similar lines in which hot-water is supplied to baths, &c., on upper floors. These combinations have been supplied to many housing schemes, including Gretna, Chepstow (250), Frodingham (250), Penistone, and Wallsend.

Combined Range and Water Heater.

We illustrate herewith the latest products of Messrs. Hartley & Sugden, Ltd., of Atlas Works, Halifax, namely, the "Heatanbake" combination for domestic hot-water supply, heating and cooking, and the "Beacon" boiler for domestic hot-water supply.

The "Heatanbake" combination is designed to stand in a kitchen in place of an ordinary coal range, and in addition to heating water for baths, sinks, radiators, &c., may be used for cooking. It will burn either coal, coke, anthracite, or household refuse. The oven is placed over the fire, thus avoiding the necessity for stooping during cooking operations, while food can be heated in utensils placed on top. When the doors are open flat-irons may be heated on the bottom one, and pans may be placed directly on the fire. A gas-heated hot-plate may be fixed to either side of the fire.

The "Beacon" coke-fired boiler provides a continuous supply of hot-water for domestic

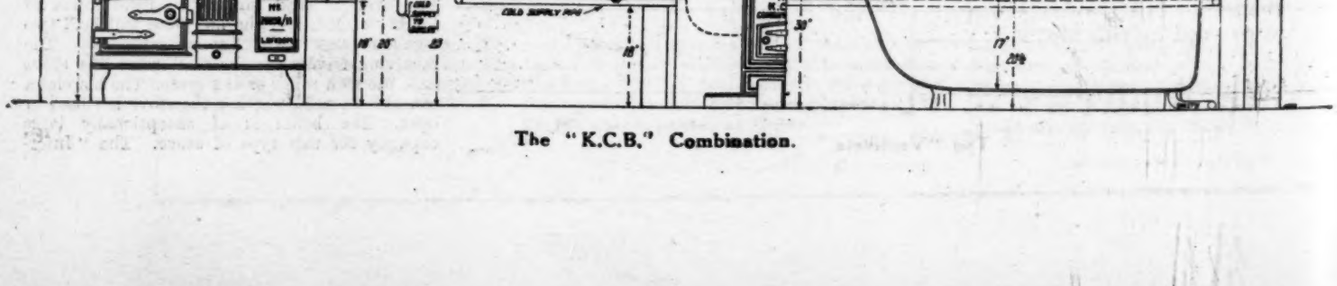


The "Heatanbake" Combination.

purposes. The pipe connections and man-lids may be on either side to suit the requirements of the room in which the boiler is to be placed.

The "Beacon" Boiler.

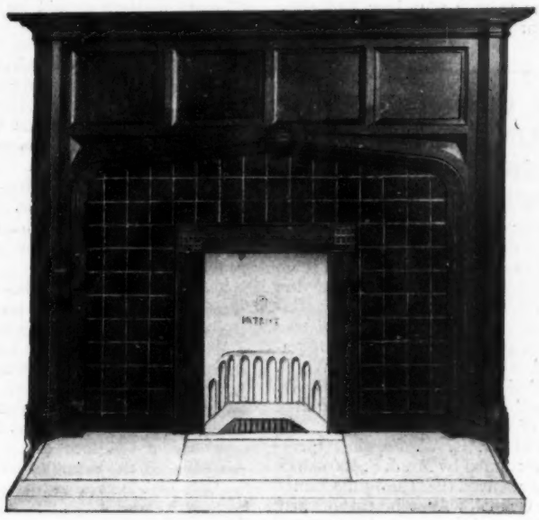
These boilers, and many others specially designed for various purposes and for use under different conditions, are illustrated and described in a booklet of some 80 pages issued by the firm.



The "K.C.B." Combination.

Well Fires.

The illustration on this page is an example of the many good designs in which the patent "well fire" is made by the Well Fire and Foundry Co., Ltd. (15. Berners-street, W. 1). The well and back brick are made of selected Stourbridge fireclay, which is claimed to possess the highest radiating efficiency of any fireclay in the world. The bottom brick is made with ventilating air-channels controlled by means of two ventilators. In its passage through these channels the air in raised to approximately the same temperature as the fire, and this hot air, on uniting with the smoke, causes the latter to burst into flame, thus consuming smoke which would otherwise be lost in the chimney. In addition to the good combustion obtained by the air supply being heated, a further advantage is that the amount of air is under control and can be regulated to suit the chimney. An economy in fuel is obtained by the fact that the cinders remain on the grate, the fine ash only falling into the well; this also eliminates the necessity for sifting. We are informed that a test made with a 14-in. fire in a room measuring 15 ft. by 15 ft. by 9 ft. 6 in. gave the following results:—The fire burned for fifty consecutive hours; the total consumption of coal was 74 lb.; the average temperature outside was 47 degrees, inside 70 degrees; the temperature was raised from 53 degrees to 76 degrees in 1½ hours; the fire burned for 23 hours without attention or feeding; the residue after consuming 74 lb. of coal in 50 hours was:—cinders 3½ lb., fine ash 3½ lb.



The "Abbey" Fire.

The chief advantages claimed for the well fire are:—It is more durable than metal; the fire after lighting will burn from 10–20 hours without any attention; this result is obtained through supplying the fire with super-heated air and not cold air, which puts the fire out as soon as the carbon is consumed; it actually consumes smoke; the fire will burn either coal, wood or peat, and only a handful of fine ashes remains after one day's burning.

The company has also a department for central heating and domestic engineering. All classes of central heating are dealt with, both for public and private buildings, also factories and commercial buildings, by hot-water (gravity and pump accelerated) low-pressure and high-pressure steam plant, for heating and all commercial purposes, mechanical ventilation, plenum plants, dust extraction and humidifying plant, hot-water services, fire service mains, cooking plants, laundry installations, vacuum cleaning apparatus, &c.

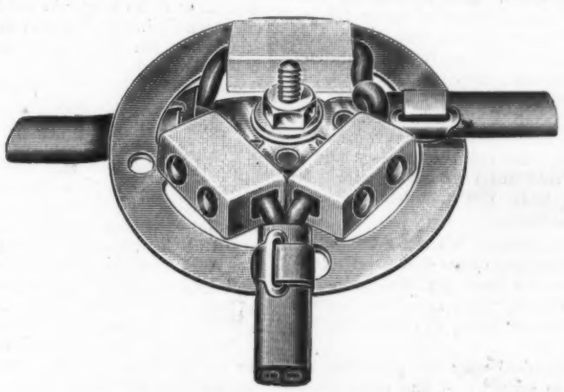
Radiation, Ltd. (an association of six gas-stove manufacturers), announce that a further reduction in the selling prices of standardised "Radiation" gas-grates has just come into operation.

A NEW WIRING SYSTEM.

In designing the new "Kingsway" wiring system (illustrated herewith) the General Electric Co., Ltd. (Magnet House, Kingsway, W.C.2) have had in view the necessity for complying with the requirements demanded of such a system, and also the desirability of reducing the number of special accessories and parts to a minimum. The new system is claimed to be simple in design, easily installed, not unsightly, safe in operation, and moderate in cost. The assortment of small bolts and nuts often associated with surface-wiring systems is absent in the "Kingsway" system, and such apparatus as switches, distribution boards, ceiling roses, &c., are all of the ordinary standard patterns. The system is one in which metal-sheathed wire and cables are employed. These are the Company's well-known class L.I. grade lead-covered cables, manufactured at the Pirelli-General Cable Works, Southampton. The wires are fixed to the walls and ceilings by saddles or wiring clips. All connections are made by means of insulated connectors, and the continuity of the metal sheathing is effected by continuity clips attached to a special back-plate. Joints and back-plates are covered either by a "Kingsway" universal junction-box cover or by a wood pattrass.

The back-plate is of stout tinned brass, provided with a centre screw which acts as an earth terminal and also as fixing for either the junction box-cover or a wood pattrass. Two washers and a clamp nut are provided to secure the continuity clips, and two large and two small holes in the base allow for fixing in any posintio The continuity clip has been designed to avoid the use of independent binding clamps. Only one size of clip is required for providing adequate binding of the metal sheathing, whether the cables enter the junction-box or wood pattrass from the side or back. When the cables enter from the side the hole nearer the end is threaded on to the centre screw of the back-plate. For back entry the second hole is used and the overlap broken off. The cover can be adapted, without the use of special tools, for any number of entries up to four, by bending upwards and inwards the tongues of metal formed between the slits in the wall. Four sets of three slits are provided, allowing for single, twin, or three-core cable. A milled nut is provided for fixing, and is permanently attached to the cover to avoid loss.

The wiring clips are constructed of soft tinned brass, and the fixing hole is countersunk so that the heads of screws or fixing pins cannot project above the surface of the clip and cause injury to the metal sheathing of the cable. For use at the back of fuseboards, multiple switch boards, and other positions where it is necessary to bind several cables together a special earthing bar is recommended. These are made of stout tinned brass strip, and the connections are made by means of the "Kingsway" continuity clip which is attached by a flat-headed countersunk screw. A terminal with nut and washer is provided for the earth connection. The Company have just issued a new section (Section W.2) of their catalogue giving a very complete description of the system, with full prices of the various suitable accessories and materials.



The "Kingsway" Backplate.

[With wires and connection in position, showing method of binding.]

HOUSING AND TOWN-PLANNING NOTES.

The Density of Houses.

A proposal by the Housing Committee of Edinburgh Town Council to increase the density of houses per acre from 18 to 24 under the Craigentinny town-planning scheme was discussed at a meeting of the Council last week and approved by a large majority.

Land for Housing.

At a meeting of the Skipton Urban District Council last week the arbitration award in regard to the negotiations between the Council and Lord Hothfield as to the purchase price of land for housing purposes was announced.

The award is that the Council is to pay Lord Hothfield £3,077, that each party is to pay its own costs, and that the Council is to pay the arbitrator's fee of £42.

Mr. Aldersley (Chairman of the Housing Committee) stated that the Council in May, 1919, offered £200 per acre, and in June, 1919, Lord Hothfield replied that he would sell at £423 10s. an acre. Under the arbitrator's award the Council is now to pay £198 16s. 6d. per acre.

THE BUILDING TRADE.

NORTHERN COUNTIES CONFEDERATION OF BUILDING TRADES' EMPLOYERS' FEDERATIONS.

A MEETING of the Council of the Northern Counties Confederation of Building Trades' Employers' Federations was recently held at Newcastle-on-Tyne, when there were present Messrs. Stanley Miller (in the chair), J. S. Earnshaw, G. A. Leck, J. L. Hilton (representing the Northern Counties Federation of Building Trades' Employers), R. H. Rowell, W. B. Aynsley, C. Curtis, W. Scott, and J. C. Graham (representing the N.E. Coast Master Plumbers' Federations), C. E. France, F. C. Atkinson, Alderman Wylie (representing the N. of E. Branch of the Master Slaters' Association), J. W. Alder, A. Armitstead, J. Cottrell and J. S. Brown (representing the Northern Counties Master Painters' Federations), and W. H. Hope (Secretary).

AREA COUNCIL.—Letters ratifying their adherence to the Area Council Scheme were read from the N.E. Coast Association of Master Plumbers, the North of England Branch of the Master Slaters' Federations, and a reply was submitted from the North of England Master Painters' Federation submitting the following qualification, namely, that the approval of its Executive to the N.E. Coast Area Council Scheme was conditional on its being established that in all painting craft matters the final authority should lie with the Painting Trade Joint Council.

CONSTITUTION OF THE CONFEDERATION.—A letter was read from the Master Slaters' Federation submitting a qualification of its ratification of membership of the Confederation, with reference to tendering by sub-contractors to non-confederated builders. The question raised was whether sub-contractors were at liberty to tender to architects, private persons or firms, municipalities, Government offices and the like. It was reported by the builders that the letter had been under consideration, and that they desired to meet the slaters at an early date to ascertain exactly what was in the minds of the master slaters. A further question was addressed to the Chairman, from which it appeared that the slaters would be at liberty to tender to municipal authorities as hitherto, except for work which those authorities were carrying out by employment of direct labour, a policy which had been accepted by the rest of the sub-trades as well as by the Builders' Federation. Further, they would not be expected to tender or to carry out work on contracts undertaken by guilds. Mr. Rowell said that by the Inter-Trading Rule, which was part of the Constitution, all the trades would be expected to refrain from executing work for employers who were not members of their respective associations.

OPERATIVE PLUMBERS' WAGE.—Mr. Rowell said that the plumbers' wage had been settled by agreement on the basis that the operatives should receive on the Tyne and Tees, as from August 25, 2s. 2d. per hour, and from September 1, 2s. 1½d.

The Chairman asked why the plumbers had settled for 1d. in advance of the other trades in view of the decision of the National Wages Council. In reply Mr. Rowell said the decision did not fix the rate of wage but only dealt with the amount of reduction, and although the award was not binding on the operative plumbers the masters considered themselves entitled to the benefit of that reduction; they had given proper notice to the operatives and had secured their acceptance of the amount stated in the award. Until the penny difference of the plumbers' wage was dealt with nationally he was afraid the plumbers of the north-east coast alone were not in a position to enforce the prevalent builders' wage.

BUILDERS AND DIRECT LABOUR.—The Builders' Federation had asked for the co-operation of the sub-trades in refraining from tendering to the Tynemouth Corporation for houses on the East Howdon scheme on the ground that the Corporation had, after protracted negotiations, accepted a contractor's price for the work and had then turned it down for direct labour. The master plumbers had confirmed their support, as also had the master painters.

NORTHERN COUNTIES AREA JOINT COUNCIL FOR THE BUILDING TRADES.

INAUGURAL MEETING.

THE first meeting of the Northern Counties Area Joint Council for the Building Trades was held recently at Newcastle-on-Tyne, when there were present nineteen representatives of the employers and seventeen operatives' representatives. Mr. Stanley Miller (Employers) was elected to the chair, and Mr. W. Paterson (Operatives) was elected Vice-Chairman. Mr. W. H. Hope (Employers' Secretary) and Mr. R. W. Foggin (Operatives' Secretary) were appointed Joint Secretaries of the Council.

On the motion of Mr. R. W. Foggin (Operatives' Secretary), seconded by Mr. J. S. Earnshaw (Employers) it was resolved that the Joint Council for the Northern Counties Area be established, and that the draft constitution already approved by the adherent bodies be accepted as the Constitution of the Council. It was mentioned that the United Operative Plumbers' Federation was not represented at that meeting and could not yet be regarded as parties to the scheme, although they were members of the Operatives' Federation. As the matter was still under consideration, and there was a possibility that the United Operative Plumbers' Federation might become a member of the Council at a later date, further consideration of the question was deferred.

An application had been addressed by the Public Works and Constructional Operatives' Union to the Employers' Secretary asking for representation of that body upon the Conciliation Boards of the Northern Counties. The Employers' Secretary had replied that these Boards were no longer in existence but that an effort was being made to set up a further similar Board for the area and that the application would be kept in view.

NORTHERN CENTRE CONCILIATION BOARD.—It was reported that the Northern Centre Conciliation Board at its closing meeting had passed a resolution recommending to the areas covered by the Northern Centre the desirability of retaining a board similar in character to the Conciliation Board, to which all matters might be submitted that failed to find a settlement by the Area Council or to deal with questions which the Area Councils might be unable to consider under their constitution, and such other questions as were not provided for in the constitution of the National Wages and Conditions Council.

Mr. Hope said the employers and operatives in the northern counties were in favour of the proposal, and it was resolved that in the opinion of the Council it was desirable that a board similar to the Northern Centre Conciliation Board should be set up for the discussion of matters outside the National Wages and Conditions Council.

CRAFT CONDITIONS.—Reference was made to the necessity in any discussion for defining carefully between matters of general principle which affected equally all trades and craft matters which were the peculiar interest of a particular trade alone.

Mr. Foggin submitted that craft matters should be discussed by the respective employers and operatives as trade matters by their own Joint Committees or Councils, and, failing agreement, by the respective national bodies, but all such settlements should be reported to the Joint Council for final approval as it was essential that the Joint Council should have the opportunity of satisfying itself that the question was a purely craft matter before any settlement was put into operation. In the first instance, all craft matters should be discussed between the respective craft employers and operatives, with the further provision for the attendance of the officials of the confederated employers and operatives so that due representation might be made in case the matters which were being dealt with as craft matters were matters which should be dealt with as matters of general concern to all the trades.

It was resolved, on the proposition of Mr. Foggin, seconded by Mr. Earnshaw, "That different craft matters be discussed by each trade under the auspices of their respective general Federations."

THE COST OF BUILDING.—A discussion took place upon the lines to be pursued in negotiating the alteration of general rules other than craft matters. The Chairman said in view of the shortage of work it was the opinion of builders and architects that no work would be let until prices were considerably reduced. The reply of the operatives was that the question of cost was not a local one, and could only be remedied as the result of national movement.

OVERTIME.—The employers' representatives raised the question of overtime, and asked for the views of the Council having regard to the number of applications which were coming forward for leave to work systematic overtime.

Mr. Foggin pointed out that the applications were particularly with reference to plasterers, who were threatened with the introduction of dilutees. The plasterers were of the opinion that they could resist the introduction of trainees if overtime were allowed. It appeared from the discussion that the applications were coming from both employers and operatives.

After discussion, it was resolved "That Local Joint Committees be recommended to give no permission to work systematic overtime in any of the building trades."

DISTRICT COUNCILS.—It was resolved that the five districts into which the Northern Counties area is divided should be advised at once to set up Joint Councils for their districts under the scheme. The districts are:—(1) Northumberland, (2) Tyne and Blyth, (3) Wear, (4) Tees and Darlington, (5) Bishop Auckland and Barnard Castle. It was also agreed that the Joint Craft Councils should continue to deal with craft matters pending the setting up atonce of the Joint Councils which would deal with matters of general principle that came within the purview of the National Wages Board and the Area Council, unless the District Councils agreed to refer any local matters to the Joint District Council under this scheme.

LABOURERS AND PAINTERS' WORK.—A report was presented of the negotiations which had taken place with the Whitley and Monkseaton Urban District Council, with which a dispute had arisen out of the employment by the Council of labourers to do painters' work. The operatives stated that they were prepared to withdraw their labour unless the Council was prepared to put the matter in order and employ painters on painters' work. The men put on to painting appeared to be roadmen, and the Joint Council was of opinion that the Urban District Council was out of order. It was resolved that before proceeding further the Council be notified of the intention of the operatives, and that it also be stated that their action had the approval of the Council.

COUNTRY MONEY.—The question was raised by the master slaters of an application from the

operative slaters for the payment of 5s. per day allowance to country jobs. It was pointed out that until the National Wages and Conditions Council had fixed the country money they could not recognise a settlement on the Tyne or the Wear or the Tees as governing the whole of the slaters for the northern counties. It was resolved that further consideration of the matter be deferred, so that complete information might be in the possession of the Council when the matter was again considered.

PUBLIC WORKS TO RELIEVE UNEMPLOYMENT.

THE decision of the Cabinet Committee on Unemployment with regard to the inauguration of works of public utility for the relief of unemployment are as follows:—

(1) Where for the purpose of providing employment in the present emergency local authorities (including statutory bodies who do not trade for profit) put in hand or accelerate approved works (other than revenue-producing works) which would not otherwise have been proceeded with, or so accelerated at the present time, the State will give financial assistance on the following basis:—Grants equal to 50 per cent. of the interest and sinking fund charges on loans raised by local authorities to meet expenditure on approved schemes actively commenced before January 1, 1922, will be paid by the State for a period of one-half the term of the loans subject to a maximum of 15 years. The expenditure to be taken into account will be all approved expenditure incurred within the period ending March 31, 1923. In approving schemes special regard will be had to the direct employment of unemployed persons and to a preference being given to ex-service men.

(2) In the case of revenue-producing works grants will be paid in approved cases equivalent to 50 per cent. of the interest on loans raised for a period of not less than 10 years, in respect of expenditure on schemes actively commenced before January 1, 1922, provided that such expenditure is incurred within the period ending March 31, 1923. These interest grants will be paid for a period of five years.

Local authorities should prepare schemes for their areas as expeditiously as possible and submit them in duplicate to the Secretary, Ministry of Health, with plans, detailed estimates, and all necessary particulars. These grants will not extend to housing schemes or other local schemes which are already in receipt of assistance from public funds, but may be applied to sites which local authorities desire to develop outside the State housing schemes. In order that the available funds may give employment to the maximum number of men the rate of wages for unskilled labour, where the local authority undertakes the work by direct labour, should for a probationary period of six months be appreciably lower than the full district rate prevailing for unskilled labour in the area. The labour will be obtained through the Employment Exchanges and workmen taken on will remain on the register of the Employment Exchanges and will be required to take other suitable work at any time if and when the Exchanges are in a position to offer it to them. For this purpose the Employment Exchanges will co-operate with the local authorities and Boards of Guardians.

Concrete Mixer.

The "Edina" batch concrete mixer has many features that will appeal to those requiring a strong machine to withstand the wear and tear to which concrete mixers are subjected on building operations. It is of the revolving drum type, mounted on a strong truck, and is adapted for either belt or engine drive. The capacity of the machine (which is manufactured by the Chalmers-Edina Co., 39B, Assembly-street, Leith) is three cubic feet per batch.

RATES OF WAGES IN THE BUILDING TRADE.

THE following are the present rates of wages in the building trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Masons' Labourers.	Bricklayers' Labourers.	Plasterers' Labourers.
Aberdare	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Accrington	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/-		1/7½	
Altrincham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Ashton-under-Lyne	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Barnsley	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Barrow-in-Furness	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Barry	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Bath	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½		1/5	
Bedford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Birkenhead	2/2	2/2	2/2	2/2	2/2	2/2	2/2		1/9½	
Birmingham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Bishop Auckland	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Blackburn	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Blackpool	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Bolton	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Bournemouth	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Bradford	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Bridgwater	1/7	1/7	1/7	1/7	1/7	1/7	1/7		1/-	
Brighton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Bristol	2/0½	2/0½	2/0½	2/0½	2/-	2/-	2/0½		1/7½	
Burnley	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Burton-on-Trent	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Bury	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Cambridge	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Cardiff	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Chatham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½		1/3½	
Chelmsford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Cheltenham	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½		1/5	
Chester	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Chesterfield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Colchester	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Coventry	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Crewe	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Darlington	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Derby	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Doncaster	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Dudley	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Durham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
East Glam. and Mon. Valleys	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Exeter	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½		1/4	
Folkestone	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½		1/3½	
Gloucester	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½		1/5	
Grantham	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Grays	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/11½		1/7½	
Grimsby	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Great Yarmouth	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½		1/3½	
Guildford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Halifax	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Harrogate	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Hartlepools	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Hastings	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½		1/3½	
Hereford	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½		1/5	
Huddersfield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Hull	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Ipswich	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Lancaster	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Leamington Spa	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Leeds	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Leicester	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/6	
Lichfield	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/7½	
Lincoln	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/9½	
Liverpool	2/2	2/2	2/2	2/2	2/2	2/2	2/2		1/7½	
Llanelly	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
London	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/11½		1/7½	
Loughborough	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/4	
Luton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/3½	
Maidstone	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½		1/7½	
Manchester	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Mansfield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Merthyr Tydfil	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Middlesbrough	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Newcastle-on-Tyne	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Newport, Mon.	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Northampton	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Norwich	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Nottingham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Oakham	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½		1/5	
Oldham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Oxford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Plymouth	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½		1/6	
Pontypridd	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Portsmouth	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Preston	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Reading	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Rochdale	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Rochester	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½		1/3½	
Rugby	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
St. Albans	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
St. Helen's	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Scarborough	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Sheffield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Shrewsbury	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Southampton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Southend-on-Sea	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Southport	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
South Shields	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Stockport	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Stockton-on-Tees	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Stoke-on-Trent	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Stroud	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8		1/4	
Sunderland	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Swansea	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Taunton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Torquay	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Tunbridge Wells	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Wakefield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Walsall	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
Warrington	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
West Bromwich	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Wigan	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Windsor	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½		1/4	
Wolverhampton	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½		1/7½	
Worcester	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	
York	1/11	1/11	1/11	1/11	1/11	1/11	1/11		1/6	

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where quantities, forms of tender, &c., may be obtained.

BUILDING AND PAINTING.

OCTOBER 1.—**Davyhulme.**—MEMORIAL.—Plans and tenders for war memorial, in the form of a clock tower, to be erected in Davyhulme Parish, at a total cost not exceeding £500. Mr. James W. Lees, Hon. Secretary, 4, Bent-terrace, Davyhulme, near Manchester.

OCTOBER 3.—**Driffield.**—ENGINE HOUSE.—Rebuilding of engine house at Wafferton Waterworks, for the R.D.C. Mr. G. Harker, Clerk, 17, Exchange-street, Driffield.

OCTOBER 3.—**Droxford.**—PAINTING.—For painting and repairs to the exterior part of the Droxford Workhouse, for the Board of Guardians. Mr. H. G. Pearson, Clerk, Bishop's Waltham, Hants.

OCTOBER 3.—**Hull.**—ADAPTATION.—For adaptation of Hull Inland Revenue Office, 58-59, Market-place, for the Commissioners of H.M. Works. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit, £1 1s.

OCTOBER 3.—**Rotherham.**—ALTERATIONS.—Alterations at Rotherham Post Office, for H.M. Office of Works. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W. 1. Deposit £1 1s.

OCTOBER 3.—**Ruislip-Northwood.**—PAINTING AND OTHER WORK.—Painting and other work necessary to put into complete repair, structural and otherwise, the Council Offices, Northwood. Mr. H. R. Metcalfe, Council Offices, Northwood. Deposit £1 1s.

OCTOBER 3.—**Southend-on-Sea.**—PAINTING.—For cleaning and painting ward block at Smallpox Hospital, Sutton-road, for the C.B. Mr. R. H. Dyer, Borough Engineer and Surveyor. Deposit £1.

OCTOBER 3.—**Weymouth.**—HOUSES.—Erection of 20 houses for the Borough of Weymouth and Melcombe Regis. Mr. Frederick Fernihough, Town Clerk, Municipal Offices, Weymouth. Deposit £2 2s.

OCTOBER 3.—**Windsor.**—PAINTING.—For painting and other work at the Almshouses. Mr. J. E. Gale, Clerk, Sheet-street, Windsor.

OCTOBER 4.—**Bath.**—ALTERATIONS.—Alterations to the Somerset Boys' Home, Bath. Mr. A. J. Pictor, architect, Bruton. Deposit £2 2s.

OCTOBER 4.—**Bethnal Green.**—REPAIRS.—Repairs to the roof of the Administrative Building, at the Bethnal Green Schools, High-road, Leytonstone, for the Board of Guardians. Mr. C. Faulkner Jones, Clerk, Bishop's-road, Bethnal Green, E. 2. Deposit £2 2s.

OCTOBER 4.—**Campbeltown.**—HOUSES.—Erection of 20 houses of three apartments each at Castleacres, for the T.C. Messrs. Clifford & Lunan, architects, 209, St. Vincent-street, Glasgow. Deposit, £1 1s.

OCTOBER 4.—**Cardiff.**—RENOVATIONS.—External renovations, &c., at Ely Lodge, for the Board of Guardians. Mr. Arthur J. Harris, Clerk, 11, Park-place, Cardiff.

OCTOBER 4.—**Nottingham.**—PAINTING.—Internal painting at Bulwell Hall, for the T.C. City Architect, Guildhall, Nottingham. Deposit, £1.

OCTOBER 5.—**Cheshunt.**—HOUSES, &C.—Construction of about 365 yds. of 9 in. and 12 in. sewer, with manholes, &c., and erection of 36 houses, for the U.D.C. Mr. J. E. Sharpe, Surveyor, Manor House, Cheshunt. Deposit, £1 1s.

OCTOBER 5.—**Goole.**—HOUSES.—Erection of 14 houses on the Pasture-road site, for the U.D.C. Mr. J. H. Castle, Surveyor, Council Offices, Goole. Deposit, £2.

OCTOBER 5.—**Llandaff.**—CONVENIENCE.—Erection of public convenience near Llandaff Station, for the R.D.C. Mr. William Farrow, surveyor, Park House, 20, Park-place Cardiff.

OCTOBER 5.—**Waltham Cross.**—HOUSES AND SEWERS.—Construction of about 365 yards of 9 in. and 12 in. sewer, with manholes, &c., and erection of 36 houses for Cheshunt U.D.C. Mr. J. E. Sharpe, Engineer and Surveyor to the Council, Manor House, Cheshunt. Deposit £1 1s. for each contract.

OCTOBER 6.—**Balham S.W.12.**—ALTERATIONS.—For alterations in connection with new obstetric wards at St. James' Hospital, for the Guardians of Wandsworth Union. Mr. F. J. Curtis, Clerk, Union Offices, St. John's Hill, S.W.18. Deposit £2.

OCTOBER 6.—**Brynbanon.**—COTTAGES, &C.—Erection of three cottages and buildings and adaptation of existing buildings, for the Merioneth C.C. Mr. R. C. Jones, Architect, County Offices, Dolgelley.

OCTOBER 6.—**Rotherhithe, S.E.**—COTTAGES.—Erection of three cottages in Orange-place, Lower-road, for Bermondsey B.C. Mr. Frederick Ryall, Town Clerk, Town Hall, Spa-road, S.E.16. Deposit £2 2s.

OCTOBER 6.—**Rufford.**—COTTAGES.—Erection of six pairs of parlour type cottages, on the Holmeswood Estate, near Rufford, for Lancashire Agricultural Committee. Mr. Henry Littler, County Architect, 16, Ribblesdale-place, Preston. Deposit £2.

OCTOBER 6.—**Salford.**—PAINTING.—For painting and decorating 13 cottages adjoining Leicester-road, Broughton, for the T.C. Borough Engineer, Town Hall, Salford.

OCTOBER 7.—**Barnsley.**—SHOP PREMISES.—Erection of shop premises, Market-street, Barnsley. Messrs. Dyson, Cawthorne & Coles, architects, 10, Regent-street, Barnsley.

✱OCTOBER 8.—**Bradford.**—HOUSES.—Erection of 64 houses Class A, and 132 houses Class B and B4, for the Corporation of the City of Bradford. City Architect, Town Hall, Bradford.

OCTOBER 8.—**Bristol.**—HOUSES.—Erection of houses on the Fishponds, Knowle, and St. John's-lane sites, for the T.C. Mr. Lessel S. McKenzie, City Engineer, Housing Department, 51, Prince-street, Bristol. Deposit £2 2s.

✱OCTOBER 8.—**Campden, Gloucester.**—COMPLETION STONE COTTAGES.—Completion of one pair of stone cottages at Station-road, Campden, for the R.D.C. Mr. W. L. Lissaman, architect, Broadway, Worcs.

OCTOBER 8.—**Chepstow.**—MARKET.—Removal of the present Cattle Market and reconstructing a new Cattle Market, for the U.D.C. Mr. J. N. Jefferies, Surveyor, Bridge-street, Chepstow. Deposit £2 2s.

OCTOBER 8.—**Edinburgh.**—HOUSES.—Erection of 44 two-story houses (22 blocks) at Longstone housing site, for the T.C. Mr. David M'Arthy, architect, 6, Albyn-place, Edinburgh.

OCTOBER 9.—**Pantag.**—HOUSES.—Erection of 20 houses at New Inn, for the U.D.C. Messrs. Fisher & Son, architects, Pontypool.

OCTOBER 10.—**Blaydon.**—ALTERATIONS.—Alterations and additions to Old Well House, Winlaton, for the U.D.C. Surveyor, Blaydon.

OCTOBER 10.—**Cardiff.**—HOUSES.—Erection of a limited number of houses at Ely, for the T.C. Mr. E. J. Elford, City Architect, City Hall, Cardiff. Deposit £2 2s.

OCTOBER 10.—**Hanwell.**—HOUSES.—Completion of 12 houses, for the U.D.C. Surveyor, Council Offices, Hanwell, W.

OCTOBER 10.—**Ushaw Moor.**—ALTERATIONS.—For improvements at Ushaw Moor Passenger Station, for the North Eastern Railway Co. Mr. A. Pollard, architect, Irving House, Westgate-road, Newcastle.

✱OCTOBER 12.—**Windsor and Salop.**—BUILDING.—(1) Erection of a new telephone exchange at Windsor; (2) farm buildings at Heath Hill, Salop, for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W. 1. Deposit £1 1s.

OCTOBER 13.—**Folkestone.**—FARM BUILDINGS.—(a) Erection of six cottages, (b) four small sets of farm buildings, (c) adaptation of the existing farm house, and (d) provision of water supply at Coombe Farm, Hawkinge, near Folkestone, for the Kent C.C. Mr. P. W. Cox, Chief Agricultural Officer, Sessions House, Maidstone.

OCTOBER 15.—**Salop.**—BUILDING.—Erection of a temporary school building in asbestic material to accommodate 120 pupils, at Bishop's Castle, for the C.C. Higher Education Office, County Buildings, Shrewsbury. Deposit £3 3s.

✱OCTOBER 18.—**Lancashire and Surrey.**—BUILDING.—(1) Erection of new post office at St. Annes-on-Sea; (2) new room at Research Institute, Addlestone, for the Commissioners of H.M. Office of Works. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s. in each case.

OCTOBER 20.—**Barnoldswick.**—PAINTING.—For painting at Barnoldswick Rainhall-road Council School, for the West Riding E.C. Education Architect, County Hall, Wakefield.

OCTOBER 20.—**Stockbridge.**—CONVERSION OF OFFICES.—Conversion of offices at Stockbridge Council School, for the West Riding Education Committee. West Riding Education Architect, County Hall, Wakefield.

OCTOBER 24.—**Hendon, N.W. 4.**—DWELLINGS.—For the completion of certain Artizans' Dwellings at Brent-hill Farm Estate, for the U.D.C. Mr. George Hornblower, F.R.I.B.A., 2, Devonshire-terrace, Portland-place, W. 1. Deposit £10 10s.

✱OCTOBER 24.—**Orsett (Essex).**—HOUSES, ROADS AND PATHS.—Erection of 24 houses, together with roads and paths, fencing and drainage, at West Thurrock, Essex, for the R.D.C. Clerk to the Council, Council Offices, 2, Orsett-road, Grays, Essex. Deposit, £5.

✱NO DATE.—**Cheshire.**—COTTAGES.—Erection of 10 single smallholder's cottages and 10 sets of farm buildings on the Dutton Estate, near Frodsham, for the Cheshire County Council. Deputy County Architect, 16, Nicholas-street, Chester. Deposit £2 2s.

NO DATE.—**Newton-in-Makerfield.**—HOSPITAL.—Erection of the administrative block (foundations of which are already in) of the proposed Cottage Hospital in Bradleigh-road, Wargrave. Messrs. Talbot & Yates, architects, 3, Silk-street, Leigh. Deposit £2 2s.

✱NO DATE.—**Shanklin (I.W.).**—BUILDING.—Messrs. Timothy White Co., Ltd., invite tenders for proposed new premises at Regent-street, Shanklin. Timothy White Co., Ltd., 30, Chandos-street, Portsmouth.

NO DATE.—**Whitehaven.**—HOUSES.—Erection of houses, for the T.C. Borough Surveyor, Town Hall, Whitehaven.

FURNITURE, MATERIALS, etc.

OCTOBER 4.—**Barton-upon-Irwell.**—ROAD MATERIALS.—Supply of road material and hire of steam-roller, for the R.D.C. Mr. G. G. Foster, Surveyor, Green-lane, Patricroft, Manchester.

OCTOBER 4.—**London.**—MATERIALS.—Supply to the Great Indian Peninsula Railway Company of (2) Lamps and fittings, (3) lamp glasses, &c., (4) twines, &c. Mr. R. H. Walpole, Secretary, 48, Copthall-avenue, E.C. 2. Charge 2 and 3, 2s. 6d.; 4, 5s.

OCTOBER 4.—**Tottenham.**—MATERIALS.—Supply of lime and cement and road materials, to the U.D.C. Mr. Reginald C. Graves, Clerk, Town Hall, Tottenham.

OCTOBER 7.—**Birkenhead.**—STORES.—Supply to the Mersey Railway of stores of all kinds. Mr. J. Shaw, General Manager, Central Station, Birkenhead.

OCTOBER 7.—**Radstock.**—ROAD MATERIALS.—Supply of road stone and also of steam-rolling, for the U.D.C. Mr. G. H. Gibson, Surveyor, Radstock.

OCTOBER 8.—**Bedlingtonshire.**—ROAD MATERIALS.—Supply of whinstone and tarred slag to the U.D.C. Mr. J. E. Johnston, Surveyor, Bedlington.

OCTOBER 11.—**Carshalton.**—ROAD MATERIALS.—Supply of 200 tons of 2 in. and 1½ in. tarred slag macadam and steam-rolling, hire of a steam-roller and scarifier. Mr. W. Willis Gale, Surveyor, Offices, The Square, Carshalton.

ENGINEERING, IRON AND STEEL.

OCTOBER 1.—**Scunthorpe.**—GASHOLDER.—For supply and erection of 2-lift gasholder and tank of 500,000 c.f. capacity, either in steel or reinforced concrete. S. Moore, Engineer, Gasworks, Scunthorpe.

OCTOBER 4.—**Barking Town.**—FIRE ENGINE.—Supply of a motor combination fire engine, to the U.D.C. Surveyor, Clock House Chambers, Barking.

OCTOBER 4.—**Ystalyfera.**—BRIDGE.—Reconstruction of bridge over Swansea Canal, for the Great Western Railway Co. Engineer, Neath Station.

OCTOBER 5.—**Australia.**—LATHES.—Supply to the Victorian Railway Commissioner of double-wheel lathes for Jolimont workshops Department of Overseas' Trade, 35, Old Queen-street, S.W.

OCTOBER 6.—**Salford.**—TANKS.—Supply and erection of two cast-iron liquor tanks, for the Gas Department. Gas Engineer, Gas Offices, Bloom-street, Salford. Deposit £1 1s.

OCTOBER 7.—**Glasgow.**—INTAKE CHAMBER, &C.—Erection of No. 2 Intake Chamber, screen house and culvert, &c., at Dalmarnock new generating station, for the T.C. Electrical Engineer, 75, Waterloo-street, Glasgow.

OCTOBER 7.—**London.**—RAILWAY MATERIALS.—Supply to the Bombay, Baroda & Central India Railway Co. of: Class A.—(1) Dog spikes; (2) steel materials. Class B.—(1) Fencing materials; (2) steel fish-bolts, nuts and washers; (3) wrought iron; (4) galvanised steel or ironwork. Class C.—Pig iron. Mr. S. G. S. Young, Secretary, The White Mansion, 91, Petty France, S.W.1. Charges £1 Class A, 10s. Class B., 5s. Class C.

OCTOBER 8.—**Eastbourne.**—HEATING.—Heating installation at St. Andrew's Presbyterian Mission Church, Hampden Park, Eastbourne. Mr. W. F. Jordan, 125, Whitley-road, Eastbourne.

OCTOBER 10.—**Australia.**—TRUSS SPANS.—Supply of three steel truss spans for bridge over River Murray, for the Victorian Railway Commissioners. Department of Overseas' Trade, 35, Old Queen-street, S.W.

OCTOBER 11.—**London.**—RAILWAY MATERIALS.—Supply to the High Commissioner for India of 25 lbs. rails and fishplates. Director-General of Stores, India Office, Whitehall, S.W.1.

OCTOBER 13.—**St. Austell.**—PUMPS.—Supply of one double set of three-throw ram pumps (second-hand), &c., for the R.D.C. Mr. A. T. Green, Surveyor, Grant's-walk, St. Austell.

OCTOBER 14.—**Crossgates.**—ELECTRIC INSTALLATION.—Electric lighting work at new school, Crossgates, for the Fife Education Authority. Mr. C. R. Douglas, Ordained Surveyor, 15, East Port, Dunfermline. Deposit £1 1s.

OCTOBER 15.—**Harrogate.**—BOILER.—Taking down existing boiler and provision and fixing of a new cast-iron sectional boiler at Harrogate Secondary School. Education Architect, County Hall, Wakefield.

OCTOBER 15.—**Wallasey.**—LANDING STAGE.—Construction of new floating goods landing stage, approximately 320 ft. in length and 80 ft. in breadth, for the T.C. Messrs. Wilton & Bell, engineers, Westminster Chambers, 1, Crosshall-street, Liverpool. Deposit £5 5s.

OCTOBER 31.—**Australia.**—BRIDGE WORK.—Supply of metal work for lift bridge over the Murray River, for Department of Public Works, Sydney. Department of Overseas Trade, 35, Old Queen-street, S.W.

OCTOBER 31.—**Madras.**—C.I. PIPES, &C.—Supply and delivery of cast-iron pipes, special castings, sluice valves, &c. for Madras Corporation. Mansergh & Sons, agents, 5, Victoria-street, Westminster, S.W 1. Deposit Rs. 500.

NOVEMBER 16.—**Littleton (Middlesex).**—PUMPS.—Supply and erection of pumping machinery at Littleton, Middlesex, for the Metropolitan Water Board. Mr. Henry E. Stilgoe, Chief Engineer, 173, Rosebery-avenue, E.C. 1. Deposit £3 3s.

DECEMBER 20.—**Costa Rica.**—WHARF.—Construction of reinforced concrete wharf at Puntarenes, for the Public Works Department.—Department of Overseas Trade, 35, Old Queen-street, S.W.

DECEMBER 31.—**Siam.**—STEELWORK.—Supply of superstructures of steel railway bridges, for the Siamese State Railways. Messrs. C. P. Sandberg, 40, Grosvenor-gardens, London, S.W. 1. Charge 10s.

ROAD, SANITARY, AND WATER WORKS.

SEPTEMBER 30.—**Kirkburton.**—ROADS.—Repairs to George-street, for the U.D.C. Mr. Fred Hobson, Surveyor, Council Offices, Kirkburton.

SEPTEMBER 30.—**Lymm.**—SANITARY.—Carrying out of sanitary repairs and drainage and other works at certain properties in Higher-lane, Rush Green, Massey Brook-lane and Newfield, Lymm, for the U.D.C. Surveyor Council Offices, Lymm.

SEPTEMBER 30.—**St. Mellons.**—ROADS.—Construction of roads in connection with Rogerstone housing scheme, for the R.D.C. Messrs. T. Morgan & Partners, engineers, 23, Gelliwastad-road, Pontypridd. Deposit £2 2s.

OCTOBER 1.—**Morley.**—ROADS.—Formation of paths and fences, at Victoria-road housing site, for the T.C. Mr. F. Turner, Borough Engineer, Town Hall, Morley.

OCTOBER 3.—**Wallsend.**—SANITARY.—Conversion of privy closets into water closets, for the T.C. Borough Surveyor, Town Hall, Wallsend.

OCTOBER 4.—**Cranbrook.**—SANITARY.— Emptying and cleansing of 153 cesspools and privies, and 190 ashpits in the town of Cranbrook and village of Sissinghurst, for the R.D.C. Mr. J. H. Bayley, Penryn, Cranbrook.

OCTOBER 5.—**Bandeath.** — SEWER. — Constructing main sewer at Bandeath Royal Naval Ordnance Depot, for H.M. Office of Works. Architect, H.M. Office of Works, 4–5, Drumsheugh-gardens, Edinburgh. Deposit £1 1s.

OCTOBER 10.—**Blaydon.**—ROADS.—Making up St. Cuthbert's-place, School Back-street, South Back Cuthbert's-place, Aldan-street, Oswin-street, East and West Back Oswin street and Rectory Back-street, all at Blaydon, for the U.D.C. Surveyor, Blaydon. Deposit £1 1s.

OCTOBER 10.—**Blaydon.**—ROADS.—Making up Pear Tree-road, Access-road, South Back Derwent-street, Derwent-street, Back Bewick-road, and Derwent-street, and Back River-view and Chopwell-road, for the U.D.C. Surveyor, Blaydon. Deposit £1 1s.

OCTOBER 10.—**Cramlington.**—SEWER.—Laying of about 600 lineal yards of 12 in. sanitary pipe sewer at Shankhouse, for the U.D.C. Mr. A. S. Dinning, Engineer, 21, Ellison-place, Newcastle-on-Tyne.

OCTOBER 11.—**Newton Abbot.**—WATERWORKS.—Supplying and laying about 1,400 yards of 3 in. cast-iron water mains, construction of a reservoir to contain about 11,000 galls. of water, for the R.D.C. Mr. S. Segar, Engineer, 37, Devon-square, Newton Abbot. Deposit £2 2s.

NOVEMBER 17.—**Uruguay.**—WATER AND DRAINAGE WORKS.—**Construction of water and drainage works at San Jose. Department of Overseas Trade, 35, Old Queen-street, S.W.**

Competitions.

(*See Competition News, page* 404.)

Auction Sales. Tenders, etc.

SEPTEMBER 28.—**London, S.E.**—Mr. Frank G. Bowen will sell at Petrograd Wharf, 369, St. James'-road, Old Kent-road, S.E. 1, the remaining portion of the salvage stock of imported timber (the fourth portion of which is slightly damaged by water only). Auctioneers, 62A, Aldersgate-street, London, E.C. 1.

✱OCTOBER 12.—**Sussex.**—Messrs. Harris & Gillow will sell by direction of the Disposal Board, at No. 4, Battalion Lines, Shoreham Camp, Shoreham-by-Sea, Sussex, camp buildings, building materials, camp equipment, and a number of effects. Auctioneers, 21, North Audley-street, London, W.1., and at Shoreham-by-the-Sea.

✱OCTOBER 19 AND 20. — **Portsmouth.** — Messrs. Bowler & Blake will sell, at the Yard, Goldsmith's-avenue, Portsmouth, by instructions from Messrs. H. A. Evans, builders' merchants, Goldsmith's-avenue, Portsmouth, a large quantity of surplus stock, timber, roof trusses, hoop iron, ironmongery and brass foundery, tools for all trades, and numerous other lots. Auctioneers, Fratton Bridge, Portsmouth.

✱OCTOBER 20. — **Leicester.** — For sale by private treaty the business of an asphalter formerly carried on by William Nunn, deceased. Mr. P. W. Lawrie, Incorporated Accountant, 5, Granby-street, Leicester.

Public Appointments.

✱NO DATE.—**Hong Kong.**—Architectural Assistant required, at once, by the Government of Hong Kong, for three years' service as Assistant Engineer in the Public Works Department, with prospect of permanency. Crown Agents for the Colonies, 4, Millbank, London, S.W.1., quoting M/Hong Kong 11034.

NEW COMPANIES.

THE particulars quoted below have been compiled by Messrs. Jordan & Sons, Ltd., Company Registration Agents, of 116 & 117, Chancery-lane, W.C. 2, from the documents available at the Companies' Registry.

EPSOM BRICK & TILE CO., LTD. (176,747). Registered September 12. Concrete, brick, tile and pipe manufacturers. Nominal capital, £10,000.

GENERAL FIREPROOFING CO. (ENGLAND), LTD. (176,750). Registered September 12. 3, Central-buildings, Westminster, S.W. 1. Builders and contractors. Nominal capital, £100.

FRED ATKIN & CO., LTD. (176,780). Registered September 14. Painters, paperhangers and decorators. Nominal capital, £1,500.

HUDSON BROS. (BUILDERS), LTD. (176,783). Registered September 14. 207, St. John's Hill, Clapham Junction, S.W. 11. Builders and contractors. Nominal capital, £5,000.

BOOKS.

Reinforced Concrete Tables. By "Conrod." Newcastle-upon-Tyne: Andrew Reid & Co., Ltd. Price 2s. 6d. net.

This little book contains, in a concise form, tables for all the calculations that are likely to be met with in the course of a usual practice. The tables show, in the case of beams, the size of the beam, the area of reinforcement and its composition and the diameter of the stirrups. Combined beams and slabs, columns, and column foundations, are also included. These tables are followed by lists of weights of materials, floor loads, and the carrying capacities of various concretes, and are preceded by a few notes of a general character. The book is well indexed, and may be recommended to all whose work brings them in touch with reinforced concrete in its simpler aspects.

Capital and Labour, Their Duties and Responsibilities. By WALTER JONES, J.P., M.I.Mech.E. London: P. S. King & Son, Ltd. Price 2s. 6d. net.

The reader of this volume will be impressed by Mr. Jones' virility, his loyalty, the optimistic view he takes of the British character, and his desire for fair play for both capital and labour. The chief feature of the book is the expressed desire to reduce the present rate of interest on capital, to which high rate the author attributes all the present unrest and poverty, as preventing the proper remuneration of both mental work and manual labour. He would limit interest on loans to 2 per cent., and where the owner risks his capital on useful production, to 10 per cent., all capital so used to be insured against loss. He says that France and Germany are adopting forced loans at 2 per cent., and that unless the British Empire follows suit it will be "a back number" in fifty years. The author runs his business on a profit-sharing basis, and the information contained in his book is gathered from his experiences of capital and labour during sixty years.

"Red Book" of the British Fire-Prevention Committee. No. 223. London: H.M. Stationery Office. Price 2s. 6d. net.

This report is a further one of the series issued by the British Fire Prevention Committee, and deals with experiments carried out under the scientific direction of its special commission on the fire resistance of concrete and reinforced concrete, under the chairmanship of Sir Henry Tanner, C.B., I.S.O. The report is arranged in the same form as its predecessor, so that comparison in the results of the tests is facilitated. A comparison, for example with "Red Book" No. 222, shows that broken brick aggregate yields more favourable results than Thames ballast, Nuneaton granite or tarred gravel. Another comparison that can readily be made is the improvement effected by covering the reinforcement with 1 in. of concrete instead of ½ in. The pamphlet is very fully illustrated with diagrams and photographs of the slabs before, during, and after the tests, and contains full details of the plant used, the method of making the slabs, and of conducting the tests, including detailed logs during the experiments which lasted about four hours. The tests comprise both fire and water.

Everyday Uses of Portland Cement. London: The Cement Marketing Co., Ltd. Price 7s. 6d. net.

A generalisation might be made, containing more than the amount of truth usually found in such statements, to the effect that England makes discoveries which other countries exploit. Portland cement is a typical example. It was patented by Joseph Aspdin, of Leeds, in 1824, and its first extensive use was in the Thames Tunnel in 1828, yet now it is more largely employed in other countries, particularly America, than in the country of its origin. This work comprises in its 480 pages a wealth of information concerning the uses of this ubiquitous material, illustrated by examples of actual work from different parts of the world. We are particularly glad to see that several pages and illustrations are devoted to surface treatment; a branch of the subject concerning which greater knowledge in England is extremely desirable. We have often heard deprecatory remarks concerning the surface of a concrete building, and such remarks have, for the most part, been justified, but their cause might well have been avoided had knowledge and experience of surface treatment been more generally known.

A persistently growing sphere of activity for concrete is in connection with farm buildings. For cow-houses, piggeries, stables, and the like, it is proving itself to be quite the most suitable material, on account of its cleanliness, power of durability, and ease of erection. These uses of concrete are extensively dealt with in chapters which are of great value.

Since the war a real impetus has been given to concrete cottage building. By-laws have been relaxed under the 1919 Housing Act, and this, coupled with labour and material shortage, has led to an extensive adoption of concrete. Descriptions and illustrations of many up-to-date schemes are included. We are surprised to see that so slight a reference is made to the cement gun. This is an appliance to which, in our opinion, we may look for marked developments and increased activity.

For certain kinds of building reinforced concrete is rapidly becoming the recognised material. The fact that it is superseding steel work must be to the eventual good of architecture, although architects appear slow to recognise this fact. Steel work is essentially a dual enterprise comprising the work of the engineer and of the architect, the two having very often but little intimate relation with each other. Reinforced concrete demands a closer collaboration, for it is a material that is at once plastic, strong in tension and compression, capable of receiving and retaining the impress of delicate craftsmanship. But the best results will only be obtained when harmony exists between the architect and the engineer, and when a respect for the particular qualification of the other replaces a somewhat inimical attitude of toleration. The new edition of this already justly popular book should do much to bring about this desirable state of affairs.

TRADE NEWS.

The telephone number of Messrs. Sydney Priday & Sons, wainscot oak merchants, of 25, Monument-street, E.C. 3, has been altered to Minories 1162 (two lines).

The recent reduction in the price of some classes of structural ironwork will, no doubt, have a considerable effect in increasing the demand for these materials, especially now so many large buildings are being constructed on the frame principle. For those concerned with such buildings, it is interesting to know that large stocks of all descriptions of constructional iron and steel are held by Messrs. P. & R. Fleming & Co., of 29, Argyle-street, Glasgow, including rolled steel joists, steel channels and flitch-plates, bar iron, iron hoops, tees, angles, &c.

The "Ideal Home" Exhibition now being held at Glasgow should attract special attention to heating systems, for the upkeep of fires and cooking are responsible for a very large proportion of the labour of housekeeping; and it is in these directions, therefore, that there is considerable scope, not only for saving labour, but also for obtaining better results at a cheaper cost. The installation of heating and hot-water systems requires a great deal of technical knowledge if the best results are to be obtained, and the experience gained by such firms as Messrs. S. D. Murray & Co., Ltd., of 45, Hope-street, Glasgow, who specialise in heating, ventilating and domestic engineering, should be of great service to those considering the installation of such systems.

PROPOSED NEW BUILDINGS AND OTHER WORKS.*

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ABERDEEN.—Plans passed: Store and office at Fraser-place for Mr. A. Bain, machine merchant; sports pavilion at Linksfield-road, for the Aberdeen Territorial Army Association, and engineering shop at Holland-street, for Mr. J. M. Forbes.

ANTRIM.—The trustees of the late Mr. Andrew Carnegie have offered to provide, equip, and maintain a public library for County Antrim.

BARNES.—Plans passed by U.D.C.: Eight houses, Bracken-gardens, by Mr. A. C. Kerven; new vicarage for St. Michael and All Angels' Church, by Messrs. Giles, Gough & Trollope; six houses, Hertford-road, by Mr. A. Basden; four detached houses, Hertford-road, by Mr. A. Basden; sanitary convenience, Palewell Estate Office, by Messrs. Debenham, Tewson, & Chinnocks; house, Upper Sheen-lane, by Mr. F. H. Shearley; four houses, Westmoreland-road, by Mr. A. Harvey; house, Percival-road, by Mr. G. A. Gale.

BARNSLEY.—The E.C. has informed the Board of Education that it is necessary to find provision for 400 students in the proposed central school.

BIRKENHEAD.—Plans passed by the T.C.: Garage and showroom corner of Woodchurch-road; alterations, 272, Chester-road; alterations and additions, 38, Church-road; alterations, 250 and 252, Conway-street; 24 houses, Highfield South, for Mr. H. G. Jones.

CLITHEROE.—The Borough Surveyor has been instructed to prepare a revised scheme and estimate of the cost of laying-out Henthorn Park.

CROYDON.—Plans passed by T.C.: Woodward & Co., tower to St. Martin's Church, Morland-road (St. Martin's Church); Josolyne & Young, cottage, Pollards-hill South; E. A. Smith, bungalow, Orchard-avenue, Wickham-road; H. Burgess, bungalow, Fryston-avenue, Addiscombe; Bethell & Swannell, branch stores, Portland-road, South Norwood; C. P. Whiteley & Son, scullery extension, &c., "Southlands," Pollards-hill West; John Campbell, bungalow, Monks Orchard Estate; George Ive, house, Norbury Hill-road, S.E.19; W. Boyce, convert cart-house into bungalow, Monks Orchard Estate (Harm Farm); M. O. Lewis, motor garage, "Sylvan Lodge," Auckland-road, Upper Norwood; E. Streeter, garage, 60, Leslie Park-road; J. Clark, alterations, 30, Church-street; C. H. Ridge, garage, 10, Chichester-road; Berney & Son, billiard-room, 63, Park-lane; Wm. Mann, bungalow, Monks Orchard Estate; C. & R. Harding, four houses, Pollards-hill South; Thompson & Walford, room in roof, Brighton-road, Purley Cottage Hospital.

GREENWICH.—Drainage plans passed by B.C.: Mr. John H. Crisp, at No. 17, Woodland-terrace, Charlton; Messrs. J. H. Sutch & Sons, at 127, Church-lane, Charlton; Mr. J. J. Forrest, at "Anchor and Hope" public house, Anchor and Hope-lane; Mr. Ellis Stone, 113 and 113A, South-street; Mr. Alfred Roberts, at 236, Trafalgar-road; Messrs. J. Larner & Sons, at 27, 29, and 31, Hyde Vale; Mr. P. B. Dannatt, at 18, Maidenstone-hill; Mr. A. D. Johnson, Maryon Institute, East Street, Charlton; Mr. Alfred Roberts, at 22 houses on the Fairfield Site of the Greenwich Borough Council's Housing Scheme; Mr. Alfred Roberts, at 11 houses on the Fairfield Site of the Borough Council's Housing Scheme; Mr. Alfred Roberts, at 18 houses on the Hanging Wood-lane Site No. 1; Mr. Alfred Roberts, at 26 houses on the East Mascalls Estate; the Telegraph Construction and Maintenance Co., Ltd., at Enderby's Wharf, East Greenwich.

HACKNEY.—Plans passed by B.C.: Bakehouse extension, &c., 49, Greenwood-road, for Mr. G. Dickson; four motor garages, 125, Dunlace-road, for Mr. E. J. Robbins. Drainage plans: At 6 to 18, Chapman-road, and 5 and 6, Suther-street, for Mr. F. W. Maskell; at 56, Chatsworth-road, for Mr. T. Harrison; at 14 and 16, Wick-road, for Mr. A. Emm; at 258, Rushmore-road, for Mr. J. Orchard; at 98, Mandeville-road, for Messrs. Matthews, Matthews & Goodman.

HEBDEN BRIDGE.—The Hebden Bridge and Mytholmroyd Gas Board have decided to apply to the Ministry of Health for power to borrow £40,000 to carry out renewals and extensions at the gasworks.

HESTON AND ISLEWORTH.—Plans passed by U.D.C.: Mr. J. Jones, for new sculleries, &c., at 85, and 95, London-road, Brentford End; Mr. W. Leighfield, motor cycle house and store at Jersey-road, Spring Grove; Mr. E. G. Burr, two houses at Church-road, Spring Grove; Mr. E. G. Burr, six houses at Ridgeway-road, Spring Grove; Messrs. Daneis & Son, lock-up shop at Montague-road, Hounslow; Mr. A. E. Stevenson, bungalow at Lampton-road, Hounslow; Miss H. Gibbs, four houses at St. Margaret's-road, St. Margaret's.

LEEK.—Permission has been given by the Justices to Mr. Alan Milton to make structural alterations at the Salisbury Picture Palace.

LEWISHAM.—Plans passed by B.C.: School, Mr. W. T. Sadler, for the London County Council; garage, Lowther-hill, for Mr. J. C. Marchant; 272 houses for the L.C.C. on Bellingham Estate.

LISBURN.—The U.D.C. has passed plans for the erection of twelve semi-detached bungalows, to be known as the Hilden Garden Estate, for Mrs. H. M. Barbour, at Hilden.

LONDON (KENSINGTON).—The Housing Committee intend, with the approval of the Ministry of Health, to proceed to the erection of 10 cottages to complete the Mary-place housing scheme.

LONDON (STOKE NEWINGTON).—Plan passed: Two-story building, Selsea-place, Crossway, for Mr. G. A. Turner.

MIDDLESBROUGH.—The baths manager has laid before the Sanitary Committee proposals for the construction of an open-air bath to be supplied by the running water which feeds the Albert Park lake. The cost was estimated at £10,000. The matter was referred to a sub-committee.

OSSETT.—Plans passed by T.C.: Eleven houses, Warneford-avenue, for Messrs. Hepworth & Moorhouse; rebuilding of cottage, Town End, for Mr. L. Ingham; shed, Moorcroft-street, for Messrs. Heyworth Bros.; alterations to cottages, Hylda-street, for Mr. A. Wilkinson.

OXFORD.—Plans passed: House, Riverside-road, Bodley-road, for Mr. J. E. Tyler; house, Oatlands-road, for Mr. E. Burnard; house, Botley-road, for Mr. F. Capel; conversion of stables into garage, Holywell-street, for Mr. P. Skinner.

PADIHAM.—The U.D.C. propose to have plans and estimates prepared to increase the holding capacity of the Churn Clough reservoir by raising the embankment by five feet.

PAISLEY.—Plans for a pavilion at St. James-park have been before the T.C., but the matter has been deferred.

PAISLEY.—The Dean of Guild Court has granted the application of David Donaldson Browning, engineer, 36, New-street, to erect an engine shop, smithy, and offices on his property at Marshall's-lane.

POULTON.—Plans passed by U.D.C.: Verandah and greenhouses, Mr. E. E. Shaw, Blackpool-road; addition, 13, Breck-street, Messrs. J. Kirkham, Ltd.

ROTHERHAM.—The Justices have passed plans for alterations to the Red Cross Hotel, Bridegate.

ROTHWELL.—Plans passed by U.D.C.: Engine-house Rothwell Haigh, for Messrs. H. Arnold & Son.

SMETHWICK.—Plans passed by T.C.: Alterations, Union-street, for Messrs. Simpson & Sons.; alterations and extensions, Hume-street, for Messrs. Scribbans & Co.; alterations and extensions, Corbett-street, for Messrs. Scribbans & Co.; sanitary convenience at Station Inn, Rolfe-street, for Messrs. Mitchells & Butlers, Ltd.; shed rear of 15, Cutler-street, for Mr. Clubley; shed rear of 21, Stony-lane, for Messrs. Bird & Son.

SOUTHEND-ON-SEA.—Plans passed by T.C.: Garage and flat over 4, Preston-road, for Mr. N. Jaffe; bungalow, North-avenue, for Mr. Wm. Patten; drainage Brook Cottage, Underwood-square, for Messrs. Walton & Hill; alterations and additions, The Barn, London-road, for Mr. D. Jackson; garage, First-avenue, for Mr. C. Brett; house and shop, Leigh-road, for Mr. C. Salmon; bungalow, Shaftesbury-avenue, for Mr. A. J. Arnold; 36 houses and six garages, Wellington-avenue and Nelson-road, for Mr. A. D. Martin; two bungalows, Nelson-road, for Mr. A. D. Martin; two bungalows, Nelson road, for Mr. A. D. Martin; additions, 24, Seaview-road, Leigh, for Mrs. R. Plumb; drainage, "Haydon," Underwood-square, for Mr. G. Bacon; arrangement of rooms over garage, "Mont Dol," Chalkwell-avenue, for Mr. H. G. Walker; workshop, London-road, for Mrs. P. F. Samme; covered way, Alleyn Court School, Imperial-avenue, for Mr. T. R. Wilcox; alterations and additions, 20, Eastern-esplanade, for Mr. R. Vowles; alterations, Alexandra Hotel, Alexandra-street, for Messrs. Webster Bros.; stable, East-street, Prittlewell, for Mr. W. Macklin; house, Crowstone-road, for Mr. F. J. Riches; house, Gordon-road, Leigh, for Mr. A. Gray; additions, Cliffs Hotel, Cliff Parade, for Mr. E. Beecroft; alterations, Esplanade Hotel, for Messrs. Loveys & Taylor; house, Cossington-road, for Mr. S. Melloy; two houses, Elm-road, for Mr. J. G. Daniels; store shed, "Mont Dol," Chalkwell-avenue, for Mr. H. G. Walker; alterations and additions, 689-691, London-road, for Mr. A. M. Masters; bungalow, The Leas, Westcliff, for Mr. A. F. Ward; new premises, 135A, Hamlet Court-road, for Mr. W. Jay; garages, Leigh-road, for Messrs. Herr'age & Bishop; drainage, High-street, Leigh, for Messrs. Powling Bros.

STAFFORD.—Plan passed: Lotus, Ltd., building, Messrs. H. T. Sandy & E. B. Norris, architects.

SWANSEA.—The Corporation Finance Committee has decided to apply for a loan of £60,000 for housing purposes.

TYNEMOUTH.—Plans passed by T.C.: Lock-up shop, Front-street, Cullercoats, by and for Mr. G. Read; motor shed, 27, Beverley-gardens, Cullercoats, by Mr. J. D. Douglass, for Mr. H. A. Solomon; motor shed, 16, Beverley-terrace, Cullercoats, for Mr. M. Wilson; conveniences to paint factory, Alma-place, by Mr. W. Stockdale, for Messrs. Panoplix Compositions, Ltd.; motor garage, 53, Percy-park, Tynemouth, by Mr. W. Stockdale, for Mr. Edward Burnett; motor house, 49, Percy-gardens, Tynemouth, by Mr. J. Landell Nicholson, for Mr. T. S. Ward; motor show rooms north-west corner of Coach-lane and Lawson-street, North Shields, by Mr. W. Stockdale, for Messrs. G. Davidson & Son; rebuilding house, 22, Prudhoe-terrace, Tynemouth, by Mr. W. Stockdale, for Mr. Benj. Peel; two houses, Prudhoe-terrace, Mr. G. W. Landells, for Mr. B. Peel.

ULVERSTON.—Plans passed by the U.D.C.: Shed, for Mrs. Benson, as a temporary building; new shop front to 21 and 23, Market-street, for Mr. Braithwaite; building in Brewery Mount for Discharged Soldiers' and Sailors' Club.

UTTOXETER.—Plan passed by R.D.C.: House, for Mr. R. De Ville.

WANDSWORTH.—Plans passed by B.C.: Messrs. S. Kimber & Sons, garage, 61, Salford-road, Streatham; Mr. F. G. Minter, sanitary works, Ferry Works, High-street, Putney; and garage and workroom, 16, Augustus-road, Southfield; Mr. H. E. Church, for the Vacuum Oil Co., Ltd., open shed abutting upon Bridgend-road, Fairfield; Messrs. R. E. Archer additions to drains, Southmead, Southmead-road, Southfield; Palmer Foundry Co., Ltd., offices, North-street, Clapham North; Mr. R. Skinner, re-drainage of 6, Lower Park Fields, Putney; Mr. J. Sinnott, drains at 501, York-road, Fairfield; Messrs. Swain & Selley, (i) 3 houses in Montana-road, eight in Tooting Bec-road, and 28 in Avoca-road, Tooting, (ii) 30 houses on the south-eastern side of Avoca-road, Tooting, (iii) eight houses in Montana-road, Tooting; Messrs. Dowsett & Jenkins, (i) re-drainage of the Presbyterian Church, Pendennis-road, Streatham; (ii) re-drainage of Clevedean, North Drive, Streatham; Messrs. M. Stutchbury & Son, re-drainage of 105, Gaskarth-road, Balham; Messrs. Bridge & Co. (i) re-drainage of 20 to 25, inclusive, Park-crescent, Clapham South; (ii) re-drainage of 7, High-street, Clapham North; (iii) alterations and additions to Firfield, Streatham Common South; Messrs. H. Dakin & Co., Ltd., drains at St. John's Church, St. John's-road, Putney; Mr. A. L. Jenkins, shops, warehouse and lavatory, 190, Mitcham-road, Tooting; Mr. H. Curtis, store adjoining, 49, Rectory-grove, Clapham North; Messrs. D. Young & Co., re-drainage of 8, Kirkby-street, Clapham South; Messrs. Simmons Bros., re-drainage of the "Green Man" public-house, Putney Heath; Messrs. Chappel & Utting, 32 houses on south-eastern side and 38 on the north-western side of Hepworth-street, Streatham; Mr. S. Boothman, alterations and additions to Oaklawn, Atkins-road, Clapham South; Mr. J. Skinner, drains at 89, Park-hill, Clapham South; Messrs. E. R. Palmer & Co., re-drainage of 3, Veronica-road, Balham; Messrs. Chappell Bros., addition to drains, 14, Ritherdon-road, Balham; Mr. W. J. Harris, fish-bar and kitchen at 1, Putney Bridge-road, Southfield; Messrs. Payne & Norman, re-drainage of 150, Manor-street, Clapham North; Messrs. Jones Bros., addition, 65 and 67, Mitcham-road, Tooting; Mr. E. J. Logan, drains, 34, Keswick-road, Southfield; Messrs. Holloway Bros. (London), Ltd., 58 houses, Swaby-road and Roads 2 and 5 on the Magdalen Park Estate, Springfield; Mr. C. S. Kimpton, (i) two houses, 43 and 45, Seymour-road, Southfield, (ii) garage at 54, Seymour-road, Southfield; Mr. C. Houghton, lock-up shop, between 38 and 50, Balham-hill; Mr. F. Kerbey, hut, stables, &c., Eastwood-street, Streatham; Messrs. Green Bros., re-drainage of 24 and 26, Burr-road, Southfield; Messrs. J. Kidd & Son, re-drainage of 57, Clapham Park-road, Clapham South; Mr. W. Read, re-drainage of 43, Culverden-road, Balham; Mr. G. W. Beattie, addition, 24, Florian-road, Putney; Mr. W. J. Sidey, additions to Taainga, Clarence-road, Clapham South; Mr. J. Richardson, re-drainage of 118 and 120, Selkirk-road, Balham; Messrs. Dent & Hellyer, re-drainage of Downshire House, Roehampton-lane, Putney; Mr. C. Angliss, garage at Beauport, West Hill-road, Southfield; Messrs. J. F. Stonehewer & Sons, re-drainage of 9, 11, 13, and 15, Bridgefield-grove, Fairfield; Mr. H. W. Binns, additions to drains, 147, Balham High-road; Mr. E. R. Armfield, shops, 39 to 43, High-street, Putney; Mr. A. Radburn, pavilion, western side of the railway between Larkhall-rise and Edgeley-road, Clapham North.

WOMBWELL.—The Ministry of Health has given sanction to the borrowing by the U.D.C. of £1,480, in connection with the Hemingfield-road sewer scheme.

WYE.—The Lady Jane Thornhill Trustees have accepted estimates for various improvements at the school premises.

YORK.—Plans passed by T.C.: Mr. J. Hetherton, garages, Queen Anne's-road; Mr. W. West, two houses, Terry-street; Messrs. J. Terry & Sons, Ltd., latrines, &c., Vine-street Estate; City Picture Palace Co., extension to operating box, Fishergate; Mr. W. West, re-drainage, 1 and 2, Briggs-street; Armstrong Oiler Co., Ltd., store and offices, Wellington-row; Mr. Abbley, alterations, corner of Portland-street and Gillygate.

FIRES.

BURSLEM.—A fire has destroyed the joiner's shop of Mr. G. M. Sambrook, Hamel-road.

CUMBERNAULD.—A fire has occurred at Cumbernauld Station. The damage is estimated at about £1,500.

FALKIRK.—Damage estimated at between £2,000 and £3,000 has been done by a fire which broke out in the bakery premises in Dalderse-avenue, Falkirk, occupied by the Falkirk and District United Co-operative Society, Ltd.

GLASGOW.—A fire has occured in the stores of the Union Transit Co., in Cadogan-street.

MIDLOTHIAN.—The new engineering and brass-founding premises at Corstorphine, Midlothian, erected by Waddell & Sons, and just opened, have been destroyed by fire.

WELSHPOOL.—The T.C. has appointed a committee to prepare a scheme for the improvement of the borough's water supply.

The Cities of the World.

The Garden Cities and Town-planning Association has arranged to hold during the autumn and winter a series of illustrated lectures on "The Great Cities of the World." These lectures will be given monthly at King's College, London, by well-known experts, with the object of stimulating interest in the study of towns and the broader aspects of town-planning. The lectures are as follows: "The City of Jerusalem," by Professor Patrick Geddes, October 13; "Amsterdam—Past and Present," by Dr. H. P. Berlage, November 10; and "The City of Milan" (lecturer to be announced), December 8. The lectures will commence at 5.30 p.m.

* See also our List of Contracts, Competitions, etc

PRICES CURRENT OF MATERIALS.*

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry. Since our last issue various revisions have been made.—Ed.]

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge. £ s. d.

Best Stocks 5 0 0

Per 1000, Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Flettons	3 15 0	Best Blue Pressed Staffordshire ...	11 11 6
Best Stourbridge Fire bricks	12 14 0	Do. Bullnose ..	12 1 6
		Blue Wire Cuts	9 14 0
GLAZED BRICKS—			
Best White, Ivory, and Salt Glazed Stretchers ..	28 10 0	D'ble Str'tch'rs	37 0 0
		D'ble Headers	34 0 0
		One Side and two Ends ..	38 0 0
Headers	28 0 0	Two Sides and one End	39 0 0
Quoins, Bullnose and 4½in. Flats	35 0 0	Splays and Squints	36 10 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

	s. d.		
Thames Ballast	16 6	per yard,	delivered 2 miles radius Paddington.
Pit Sand	21 0	„ „	
Thames Sand	21 6	„ „	
Best Washed Sand	21 6	„ „	
¾ in. Shingle for Ferro-Concrete	21 0	„ „	
¼ in. „ „	22 0	„ „	

Per ton, delivered in London area.

	£ s. d.		£ s. d.
Best Portland Cement	4 3 6	..	4 9 0

76/6 alongside at Vauxhall in 80-ton lots.

Ferrocrete per ton extra on above 10 0

Best Ground Blue Lias Lime 2 19 8 at rly. depot.

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks. The sacks are charged at 2s. 3d. each and credited at 2s. each if returned in good condition within three months.

Grey Stone Lime ..... 74s. 0d. per ton delivered.

Stourbridge Fireclay in s'cks 44s. 8d. per ton at rly. dpt.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R.. per ft. cube.....	3 2½
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R.. per ft. cube	3 5½
Do. do. delivered on road wagons at Nine Elms Depot	3 6½
PORTLAND STONE— Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L.& S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube	4 11½
Do. do. delivered on road wagons at above stations, per ft. cube..	5 0½
White basebed, 3d. per ft. cube extra.	

NOTE.—½d. ft. cube extra for every foot over 20 ft. *average*, and ½d. beyond 30 ft.

YORK STONE, BLUE—*Robin Hood Quality.*

	s. d.
Delivered at any Goods Station London.	
Scappled random blocks .....Per Ft. Cube	14 5
6 in. sawn two sides landings to sizes (under 30 ft. super.) .....Per Ft. Super	9 0
6 in. rubbed two sides, ditto ..... „	10 1
3 in. sawn two sides slabs (random sizes) „	3 11
2 in. to 2½ in. sawn one side slabs (random sizes) ..... „	2 5
1½ in. to 2 in. ditto, ditto ..... „	2 0
HARD YORK— Delivered at any Goods Station London.	
Scappled random blocks .....Per Ft. Cube	9 3
6 in. sawn two sides landing to sizes (under 40ft. super.) .....Per Ft. Super	8 6
6 in. rubbed two sides ditto ..... „	10 4
4 in. sawn two sides slabs (random sizes) „	4 11
3 in. ditto, ditto „	4 0
2 in. self-faced random flags ..Per Yard Super	12 2

WOOD.

GOOD BUILDING DEAL.

Inches	£ s.	
4 × 11	40 0	per standard
4 × 9	35 0	
4 × 8	30 0	
4 × 7	30 0	
3 × 8	30 0	„
3 × 7	30 0	„
2½ × 7	25 0	„
3 × 6	25 0	„
3 × 11	35 0	„
2 × 11	35 0	„
3 × 9	35 0	„
2½ × 9	35 0	„
3 × 4½	25 0	„
3 × 4	22 0	„

PLANED BOARDS.

1 × 11	40 0	„
1 × 9	35 0	„

PLAIN EDGE FLOORING.

Inches		
½	20/-	per square
⅝	22/6	„
1	24/-	„
1¼	30/-	„
1½	36/-	„

TONGUED AND GROOVED FLOORING.

Inches		
1	24/-	per square
1¼	30/-	„
1½	36/-	„

WOOD (*Continued*).

MATCHINGS (BEST).

Inches	s. d.	
½	17/6	per square
⅝	20/-	„
1	27/6	„

BATTENS.

Inches	s. d.	
¾ × 2	3 3	per 100 ft.

SAWN LATHS.

Per bundle				0 4	0
Dry Wainscot Oak, per ft. super, as inch	0 2 6	to	0 3	0	
¼ in. do. do.	0 1 10½	to	0 2	6	
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch	0 2 3	to	0 3	0	
Cuba Mahogany	0 3 6	to	0 4	0	
Teak (Rangoon, Moulmein or Java), per load.. ..	52 10 0	to	55 0	0	
American Whitewood planks, per ft. cube ..	0 16 0	to	0 18	0	
Best Scotch Glue, per cwt.	10 0 0	to	—		
Liquid Glue, per cwt.....	5 8 0	to	6 15	0	

SLATES.

1st quality slates from Bangor or Portmadoc in truck load delivered London area. Per 1,000 of 1,200.

		£ s. d.
Best Blue Bangor Slates,	24 by 12	56 10 0
„ „ „	22 by 12	46 0 0
First quality „ „	22 by 11	42 10 0
„ „ „	20 by 12	42 0 0
Best Blue Portmadoc „ „	20 by 10	36 10 0
„ „ „	18 by 10	29 10 0
First quality „ „	18 by 9	24 5 0
„ „ „	16 by 10	22 15 0
„ „ „	16 by 8	18 0 0

TILES.

Per 1,000 f.o.r. London.

	£ s. d.
Best machine-made tiles from Broseley or Staffordshire district.....	7 15 0
Ditto hand-made ditto.....	8 10 0
Ornamental ditto	7 7 6
Hip and valley tiles (per dozen)	0 15 0

METALS.

JOISTS, GIRDERS, &C., TO LONDON STATION PER TON—

	£ s. d.
R. S. Joists, cut and fitted	22 0 0
Plain Compound Girders	25 0 0
„ Stanchions	27 0 0
In Roof Work	32 0 0

WROUGHT-IRON TUBES AND FITTINGS—(Discount off List for lot of not less than £15 net value delivered direct from works. 5 per cent. less above gross discounts, carriage forward if sent from London stocks.)

	Tubes. ½" to 2".	Tubes. 2½" to 6".	Fittings. ½" to 2".	Fittings. 2½" to 6".
Gas	—30	—35 ..	—30	—37½
Water	—20	—27½ ..	—25	—35
Steam	—10	—20 ..	—20	—32½
Galv'd Gas	—12½	—17½ ..	—22½	—30
„ Water	— 1½	— 8½ ..	—17½	—27½
„ Steam	+10	Nett. ..	—12½	—25

L.C.C. COATED SOIL PIPES—London Prices ex works.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6 fts..	5 10½ ..	4 2 ..	5 0
2½ in. „ „ ..	7 0½ ..	4 7 ..	6 3
3 in. „ „ ..	8 4½ ..	5 0 ..	7 6
3½ in. „ „ ..	9 3 ..	6 3 ..	8 9
4 in. „ „ ..	10 7 ..	7 1 ..	10 0

RAIN-WATER PIPES, &C.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts. plain	5 2 ..	2 6 ..	3 5
2½ in. „ „ „ ..	5 9 ..	3 0 ..	4 2
3 in. „ „ „ ..	6 8 ..	3 8 ..	5 6
3½ in. „ „ „ ..	7 9 ..	4 4 ..	6 5
4 in. „ „ „ ..	8 10 ..	5 4 ..	7 0

L.C.C. DRAIN PIPES.—9 ft. lengths. London Prices. per yd.: 4 in., 10/3. ..5 in., 12/3. .. 6 in., 14/9.

	£ s. d.		£ s. d.
IRON— Common Bars	18 10 0	to	19 10 0
Staffordshire Crown Bars — good merchant quality	19 10 0	..	20 10 0
Staffordshire "Marked Bars"	24 0 0	..	25 0 0
Mild Steel Bars	16 0 0	..	17 0 0
Steel Bars. Ferro-Concrete quality, basis price ..	16 10 0	..	17 0 0
Hoop Iron, basis price ..	24 0 0	..	25 0 0
„ Galvanised ..	38 0 0	..	40 0 0
Soft Steel Sheets, Black— Ordinary sizes to 20 g.	23 0 0	..	25 0 0
„ „ „ 24 g.	24 0 0	..	26 0 0
„ „ „ 26 g.	26 0 0	..	27 0 0
Sheets Flat Best Soft Steel, C.R. & C.A. quality— Ordinary sizes, 6ft. by 2ft. to 3ft. to 20 g.	30 0 0	..	32 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 22 g. and 24 g.....	31 0 0	..	33 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 26 g...	33 0 0	..	35 0 0
Flat and Galvanised Corrugated Sheets— Ordinary sizes, 6 ft. to 9ft. 20 g.	27 0 0	..	28 0 0
Ordinary sizes, 6ft. to 9ft. 22 g. and 24 g.	28 0 0	..	29 0 0
Ordinary sizes 6ft. to 9ft. 26 g.	30 0 0	..	32 0 0

METALS (*Continued*).

	Per ton in London. £ s. d.		£ s. d.
Sheets Galvanised Flat, Best quality— Best Soft Steel Sheets, 6ft. by 2ft. to 3ft. to 20g. and thicker ..	33 0 0	..	34 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	34 0 0	..	35 0 0
Best Soft Steel Sheets, 26 g.	36 0 0	..	37 0 0
Cut Nails, 3in. to 6in. .. (under 3in. usual trade extras.)	29 0 0	..	30 0 0

METAL WINDOWS—Standard sizes suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 8s. per foot super.

LEAD, &c.

Delivered in London.

	£ s. d.		£ s. d.
LEAD—Sheet, English, 4 lb. and up	35 10 0	..	—
Pipe in coils	36 0 0	..	—
Soil Pipe	38 10 0	..	—
Compo pipe	39 10 0	..	—

NOTE—Country delivery, 30s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s. cwt. extra.

Old lead, ex London area, at Mills ..... per ton	19 0 0	..	—
Do., ex country, carriage forward..... per ton	20 0 0	..	—
COPPER— Strong Sheet ....per lb.	0 2 3	..	—
Thin „ .... „	0 2 4	..	—
Copper nails .... „	0 2 3	..	—
Copper wire .... „	0 2 4	..	—
TIN—English Ingots „	0 1 10	..	—
SOLDER—Plumbers' „	0 0 11	..	—
Tinmen's..... „	0 1 2	..	—
Blowpipe ..... „	0 1 4	..	—

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

	Per Ft.		Per Ft.
15 oz. fourths	4½d.	32 oz. fourths	10½d.
„ thirds	5½d.	„ thirds	1/-
21 „ fourths	6½d.	Fluted, Obscured and	
„ thirds	7½d.	Enamelled Sheet.	
26 „ fourths	8d.	15 oz.	7d.
„ thirds	9½d.	21 „	9d.

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
¼ Rolled plate	5½d.
⅛ Rough rolled	6½d.
¼ Rough rolled	7½d.
Figured Rolled, Oxford Rolled, Baltic, Oceanic, Arctic, Stippolyte, and small and large Flemish white	7½d.
Ditto, tinted	9½d.
Rolled Sheet	6½d.
White Rolled Cathedral.....	6½d.
Tinted do.	7½d.

Cast Plate is ½d. extra on the price of rough rolled.

PAINTS, &c.

		£ s. d.
Raw Linseed Oil in pipes..... per gallon		0 3 5
„ „ „ in barrels .... „		0 3 6
„ „ „ in drums .... „		0 3 8
Boiled „ „ in barrels .... „		0 3 10
„ „ in drums .... „		0 4 0
Turpentine in barrels ..... „		0 6 0
„ in drums (10 gall.) .. „		0 6 3
Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.)		59 15 0
GENUINE WHITE LEAD PAINT— "Father Thames," "Nine Elms," "Park," "Supremus" and other best brands (in 14 lb. tins) not less than 5 cwt. lots .....per ton delivered		82 15 0
Red Lead, Dry (packages extra) .. per ton		41 0 0
Best Linseed Oil Putty ..... per cwt.		0 17 6
Filocol..... per cwt.		0 15 6
Size. X D Quality..... fkn.		0 5 9

VARNISHES, &c.

		Per gallon. £ s. d.
Oak Varnish.....Outside		0 15 0
Fine ditto ..... ditto		0 17 2
Fine Copal ..... ditto		1 1 6
Pale Copal ..... ditto		1 2 6
Pale Copal Carriage ..... ditto		1 4 6
Best ditto ..... ditto		1 14 6
Floor Varnish..... Inside		0 19 0
Fine Pale Paper ..... ditto		0 18 0
Fine Copal Cabinet ..... ditto		1 2 6
Fine Copal flatting ..... ditto		1 0 6
Hard drying Oak ..... ditto		0 18 0
Fine Hard drying Oak ..... ditto		0 19 0
Fine Copal Varnish ..... ditto		1 0 6
Pale ditto ..... ditto		1 2 6
Best ditto ..... ditto		1 14 6
Best Japan Gold Size.....		0 12 6
Best Black Japan		0 18 0
Oak and Mahogany Stain (water)		0 17 6
Brunswick Black		0 11 0
Berlin Black.....		0 16 6
Knotting (patent)		1 16 0
French and Brush Polish		1 8 0
Liquid Dryers in Terebine		0 13 6
Cuirass Black Enamel		0 7 0

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

CURRENT PRICES FOR BUILDING WORK IN LONDON.*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	18	0
Add if in clay	" "	1	10
Add for every additional depth of 6 ft.	" "	1	4
Planking and strutting to trenches	per foot super	0	7
Do. to sides of excavation, including shoring	" "	1	4

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6	per yard cube	49	0
Add if in underpinning in short lengths	" "	9	6
Add if in floors 6 in. thick	" "	3	10
Add if in beams	" "	4	9
Add if aggregate 1 : 2: 4	" "	14	3
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	" "	4	3

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	47	10	0
Add if in stocks	"	11	17	6
Add if in Staffordshire blues	"	31	2	6
Add if in Portland cement and sand	"	4	0	0

FACINGS.

		s.	d.
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1½

POINTING.

		s.	d.
Neat flat strucks or weathered joint	" "	0	0	3

ARCHES.

		s.	d.
Extra only to the price of ordinary brickwork :—			
Fair external in half brick rings	" "	0	0	11½
Axed in stocks	" "	0	1	11
Rubbed and gauged jointed in putty camber or segmental	" "	0	6	8

SUNDRIES.

		s.	d.
Damp course in double course of slates breaking joint and bedded in Portland cement	" "	0	1	6
Setting ordinary register grates and stoves	each	1	2	6
Setting kitchener, including forming flues, &c., with all necessary fire bricks	"	6	5	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.	8	0
Three-quarter-inch vertical damp course	" "	14	3
One inch on flats in two thicknesses	" "	12	0
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	" "	1	6

MASON.

		s.	d.
York stone templates fixed	per foot cube	19	9
York stone sills fixed	" "	31	6
Bath stone and all labour fixed	" "	15	0
Portland stone fixed	" "	23	0

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails	per square	98	0
Do. 20 in. × 10 in. Do. Do.	"	115	0
Do. 24 in. × 12 in. Do. Do.	"	117	6

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates	per foot cube	7	0
Do. joists	" "	8	0
Do. roofs, floors and partitions	" "	9	3
Do. trusses	" "	11	9

		¾″	1″	1¼″	2″
Deal rough close boarding	per sq.	42/-	48/-	56/-	85/-

		s.	d.
Flat centering for concrete floor, including struts or hangers	"	63	0
Do. to beams	per ft. sup.	1	6
Centres for arches	"	2	0
Gutter boards and beams	"	1	8

FLOORING.

		¾″	1″	1¼″	1½″
Deal-edges shot	per sq.		54/-	64/-	74/-
Do. tongued and grooved	"		60/-	72/-	80/-
Do. matchings	"	45/-	55/-		
Moulded skirting, including backings and grounds	per ft. sup.	2/-	2/3	2/9	3/3

SASHES AND FRAMES.

		s.	d.
One-and-a-half moulded sashes or casements	per foot super	1	11
Two Do. Do. Do.	" "	2	4½
Add for fitting and fixing	" "	0	6
Deal-cased frames with 1 in. inner and outer linings, 1½ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares double hung, double hung with pulleys, lines and weights ; average size	" "	4	11

DOORS.

		1½″	1¾″	2″
Two-panel square framed	per ft. sup.	2/6	2/9	2/11
Four-panel Do.	"	2/10	3/2	3/5
Two-panel moulded both sides	"	3/2	3/5	3/8
Four-panel Do. Do.	"	3/6	3/9	4/-

CARPENTER AND JOINER—continued.

FRAMES.

		s.	d.
Deal wrot moulded and rebated	per foot cube	19	0

		1″	1¼″	1½″
Plain deal jamb linings framed	per ft. sup.	2/1	2/3	2/6
Deal shelves and bearers	"	1/10	2/-	2/1
Add if cross tongued	"	2d.	2d	2d.

STAIRCASES.

	1″	1¼″	1½″	2″	2½″
Deal treads and risers in and including rough brackets	3/2	3/10	4/5	—	—
Deal strings wrot in both sides and framed	4/3	4/6	—	—	—

		s.	d.
Housings for steps and risers	each	0	11½
Deal balusters, 1 in. × 1¼ in.	per ft. run.	0	9
Mahogany handrail ; average 3 in. × 3 in.	" "	6	0
Add if ramped	" "	11	10
Add if wreathed	" "	23	9

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/4½
Sash fasteners	11½d.	Mortice locks	5/3
Casement fasteners	1/5	Patent spring hinges and letting in to floor and making good	10/-
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	25	0
Plain compound girders	"	28	0
Do. stanchions	"	31	0
In roof work	"	36	0

RAIN-WATER GOODS.

		3″	4″	5″	6″
Half-round plain rebated joints	ft. run	1/11	2/4½	3/7	4/-
Ogee Do. Do.	"	2/4½	3/1	3/10	4/9
Rain-water pipes with ears	"	2/9	3/7		
Extra for shoes and bends	each	4/4	5/11		
Do. stopped ends	"	1/11	2/4½	3/7	4/-
Do. nozzles for inlets	"	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	56	0
Do. Do. in flats	"	52	0
Extra labour and solder in coated cesspools	each	7	4
Welt joint	per ft. run.	0	6
Soldered seam	" "	1	10½
Copper nailing	" "	0	7

		¼″	½″	1″	1½″	2″	4″
Drawn lead waste	per ft. run	10d.	1/6	1/9	3/1	3/10	
Do. service	"	1/5	1/11	2/3	3/6		
Do. soil	"						6/2
Bends in lead pipe	each					3/3	8/2
Soldered stop ends	"	1/2	1/8	2/1	2/10	3/6	
Red lead joints	"	11d.	1/-	1/3	1/11	2/4	4/10
Wiped soldered joints	"	2/10	3/6	4/-	4/11	6/6	9/9
Lead traps and cleaning screws	"				14/7	19/6	
Bib cocks and joints	"	6/4	9/7	15/4	41/-		
Stop cocks and joints	"	15/4	17/2	25/8	64/-		

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard sup.	3	2
Do. Do. Sirapite	" "	3	7
Do. Do. Keen's	" "	4	9
Add sawn lathing	" "	1	11
Add metal lathing	" "	3	4
Portland cement screed	" "	2	9
Do. plain face	" "	4	6
Mouldings in plaster	per 1 girth	0	3
One-and-a-half granolithic pavings	per yard sup.	6	7

GLAZIER.

		s.	d.
21 oz. sheet plain	per foot sup.	1	4
26 oz. Do.	" "	1	7
Obscured sheet	" "	1	9
⅛ in. rolled plate	" "	1	0
¼ in. rough rolled or cast plate	" "	1	1
¼ in. wired cast plate	" "	1	7

PAINTER.

		s.	d.
Preparing and distempering, 2 coats	per yard sup.	1	5
Knotting and priming	" "		11
Plain painting 1 coat	" "	1	5
Do. 2 coats	" "	2	3
Do. 3 coats	" "	3	0
Do. 4 coats	" "	3	10
Graining	" "	2	10
Varnishing twice	" "	2	4
Sizing	" "	0	4
Flatting	" "	0	9
Enamel	" "	1	11
Wax polishing	per foot sup.	0	10½
French polishing	" "	1	8
Preparing for and hanging paper	per piece	2/- to 5/-	

* These prices apply to new buildings only. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 1½ should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

WORKS COMMITTEES.

WORKS committees and their value as a constructive unit in industry formed the subject of a conference last week, organised by the Industrial League and Council, and attended by a party representing employers and employed.

In introducing the subject for discussion, Mr. S. Ratcliffe (Chairman of the works committee of the Metropolitan Vickers Company) said no works in any industry could be successful without a works committee. There must be room for every man to find expression; the committee must be so framed that each section and each individual in each section could come forward and have any particular matter dealt with by the committee. This could be done by sub-committees, and if the committee was properly constituted any special question fell automatically into the province of a particular sub-committee. Having, as members of a works committee, accepted responsibility, the men were more careful to put themselves in the position of the manager, more careful in their demands, and, to some extent, knew how far they could press a demand. Works committees taught the men to think of the processes which an article passed through, and opened their eyes to the fact that in mass production they had to do with only a part of an article's progress, and they then liked to know something of what had happened before, and what was to follow

A resolution was unanimously passed expressing the conviction that works committees were of the greatest value to industry, and urging employers and employed in every industry to give them their immediate and serious attention with a view to getting such committees formed without delay.

PATENTS.

APPLICATIONS PUBLISHED.*

167,944.—M. D. L. Barker and C. G. Cumpston: Fastenings for gates and doors.

150,315.—L. Lemonon: Construction of dwelling-houses or other buildings.

167,972.—A. S. Adams: Concrete or clinker block and slab-making machine.

167,997.—W. J. Mellersh-Jackson (Bitoslag Paving Co.): Paving mixtures.

168,082.—E. J. Felt (F. Heath): Pilasters, piers and buttresses, and tiles or blocks therefor.

168,089.—A. Smitheman: Manufacture of bricks.

168,094.—A. Pillman: Washers for use in fixing corrugated iron roofing.

168,114.—A. Christie and R. Metcalfe: Locking latches or bolts for doors and windows.

168,126.—M. R. Sheen: Machine for building sewers and tunnels.

168,168.—A. Walker: Building blocks.

168,172.—W. Forbes: Apparatus for the manufacture of concrete blocks.

168,226.—S. Williams and W. D. Walters: Frames for windows, doors and casements.

149,681.—H. D. Farris: Water-closet bowls.

168,258.—L. Shingleton: Shuttering for use in building concrete structures.

168,267.—W. Christmas: Machines for moulding bricks and concrete blocks.

168,271.—A. B. Coleman: Carpenters' hammers.

168,286.—F. S. Pett: Mechanically-geared blocks applicable for raising, suspending and lowering of loads.

Proposed New Cinema at Sheffield.

A new cinema is proposed to be erected at Moorfields, Sheffield, with a seating capacity of 1,600 persons. The architect is Mr. P. A. Hinchliffe, F.R.I.B.A., of Barnsley.

Students' Dinner.

The next annual dinner for past and present pupils of Mr. G. P. Knowles, M.B.E., B.Sc., F.S.I., &c., will be held at the Trocadero Restaurant, on Friday, October 14. Tickets are obtainable from 39, Victoria-street, Westminster, S.W. 1.

*All these applications are now in the stage in which opposition to the grant of Patents upon them may be made.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him *not later than Tuesday evening.*

*Denotes *accepted.* †Denotes *provisionally accepted.* ‡Denotes *recommended for acceptance.* §Denotes *accepted subject to modifications.*

ABERDEEN.—For the construction of the Rowett Research Institute and Model Stock Farm. Messrs. Tawse & Allan, civil engineers and architects, 10, Bon-Accord-square, Aberdeen :—

Asphalter—	
A. W. Denholm, Aberdeen	£558 0 0
Carpenter and joiner—	
A. Hall & Son, Aberdeen	6,629 12 0
Concreter—	
Jas. Scott & Son, Ltd., Aberdeen	3,446 16 0
Drainage—	
Roderick McKay, Junr., Aberdeen	481 9 9
Excavator—	
Roderick McKay, Junr., Aberdeen	382 4 6
Heating engineer—	
John Dean, Aberdeen	1,008 0 0
Mason—	
Trustees of George Hall, Aberdeen	12,858 14 0
Painter and glazier—	
John S. Kelly, Aberdeen	621 0 0
Plasterer—	
Jas. Scott & Son, Ltd., Aberdeen	1,396 6 8
Plumber—	
John Dean, Aberdeen	1,465 15 0
Steelwork—	
Jas. Allan, Senr., & Son, Ltd., Glasgow	1,216 2 3
Electrician—	
T. C. Smith & Co., Ltd., Aberdeen	715 12 9
Roadmaker—	
James Leith, Aberdeen	1,260 0 4

ASHTON-UNDER-LYNE.—For the erection of 12 "A" type houses, including draining, footpaths and fencing, on the Heys Estate, for the Housing Committee of the T.C. Messrs. W. H. George & Son, architects, 7, Warrington-street, Ashton-under-Lyne :—

	Per block of two houses.
†James Ridyard & Sons, Ltd., Ashton-under-Lyne	£1,250 0 0
T. Dean & Co., Ltd., Ashton-under-Lyne	1,280 0 0
James Green, Ashton-under-Lyne	1,281 0 0
J. H. S. Randall, Ltd., Sheffield	1,286 11 1
Swallow & Taylor, Ashton-under-Lyne	1,290 0 0
Building Guild, Ltd., Manchester	1,297 0 0
Marshall & Sons, Ashton-under Lyne	1,338 0 0
Gerrard (1920), Ltd., Manchester	1,340 0 0
Sharples & Atherton (concrete construction)	1,355 0 0
Exors. of E. B. Charnley, Hyde	1,358 0 0
Burgess & Galt, Manchester	1,372 10 0
James Taylor, Ashton-under-Lyne	1,377 0 0
Briggs, Sons & Renshaw, Dukinfield	1,380 0 0
J. H. Bardsley (concrete blocks), Manchester	1,380 0 0
J. H. Bardsley, Manchester	1,385 0 0
R. Lehane & Co., Ltd., Darley Dale	1,400 0 0
L. Fletcher, Castleton	1,420 0 0
W. F. Drew, Ltd., Stroud	1,461 0 0
Mark Warrington, Ltd., Hyde	1,500 0 0
Hamiltons, Ltd., Blackpool	1,535 0 0

BARNSLEY.—Alterations, &c., to building proposed to be converted for use of science laboratory in Queen's-road, for the E.C. :—

*W. Goodyear & Son (*Mason and joiner work*)	£265 0
*C. D. Potter (*Plumber and glazier work*)	146 10
*T. Lindley (*Plasterer work*)	17 10
*J. Dunk & Sons (*Painter*)	67 0
*George & Co., Ltd. (*Furniture and fittings*)	1,133 0

BARNSLEY.—For painting, decorating and repairing elementary schools, for the T.C. :—

St. Mary's C. of E. Boys' School—	
*Jonathan Dunk & Sons	£133 0 0
Pitt-street C. of E. Boys' School—	
*Edward Jones	119 10 0
Baker-street C. of E. Infants' School—	
*Joseph P. Beaumont	55 0 0
Keir-street Council School—	
*J. Snowden & Son	197 10 0
Old Town Council Infants' School—	
*B. Dwight & Sons	109 0 0
Racecommon-road Council Boys'—	
*Barnsley British Co-operative Society, Ltd.	126 18 6
Racecommon-road Council Girls'—	
*Barnsley British Co-operative Society, Ltd.	117 10 6
Racecommon-road Council Infants'—	
*Barnsley British Co-operative Society, Ltd.	116 12 0
Grove-street Council Boys' School—	
*A. Squire	336 0 0

BLACKROCK (IRELAND).—For the erection of a shelter, sanitary accommodation and other equipment in the children's playground at Temple-road, for the U.D.C. Mr. Henry W. Powell, Surveyor, Town Hall, Blackrock :—

Section A and B—	
Louis Moules, Kingstown	£400 18
Section A—	
J. Lawlor, Blackrock	334 0
Section A—	
R. Warren, Blackrock	314 0

(Consideration deferred.)

BIRKENHEAD.—For (*a*) supply of dual locker desks, and (*b*) supply of teachers' desks, tables and cupboards to Park-road South Central School, for the T.C. :—

*(*a*) J. D. Bennett, Ltd.	£617 8 6
*(*b*) Bennet Furnishing Co.	211 0 6

CHEADLE.—Sewage works, for the U.D.C. :—

*J. Hurst, Cheadle	£530

CHEADLE.—Erection of 12 houses on Blythe Marsh site, for the U.D.C. :—

*J. Gretton, Burslem..(A Type) £700; (B) £695 (C) £845 and £850.

(Subject to approval of Housing Commissioner.)

CARLISLE.—For erection of 66 houses on the Longsowerby site, for the T.C. :—

*J. & R. Bell, at prices ranging from £623 to £641 each.

FOREHOE.—For the erection of 10 cottages, in pairs, at Wymondham, Norfolk, for the R.D.C. :—

	Per pair.
*Bidewell, Wymondham	£1,020 0 0
English & Son, Drayton	1,074 17 0
Bowden, Wymondham	1,098 10 0
Palmer, Aylsham	1,115 0 0
Skipper & Bartram, Wymondham	1,136 0 0
Blazey, Wymondham	1,136 12 10
Greengrass, Norwich	1,158 0 0
Rice Bros., Norwich	1,175 0 0
Young, Norwich	1,258 0 0
R. Claxton, Wighton	1,370 0 0
Larner, Garvaston	1,381 0 0
Lavington, London	1,440 0 0
Hannant, Norwich	1,610 0 0

GLASGOW.—Erection of turbine and motor house at Riddrie, for the T.C. :—

*R. Marshall	£2,382 15 3

GLASGOW.—Supply of 187 tons 12 cwt. of 18 in. cast-iron pipes, for the Water Department of the T.C. :—

*Joint Stock Co. of the Ironworks & Foundries of the Pont à Mousson, Nancy	£2,251 4

GLASGOW.—Construction of sewer in Langlands-road, for the T.C. :—

*John Drysdale	£1,472 7 6

GLASGOW.—Painting at (*a*) reading room; and (*b*) exterior of Mitchell Library, for the T.C. :—

*J. Stirling, Glasgow—	
(*a*)	£330 19 0
(*b*)	75 1 4

GLASGOW.—Supply of plant and fitting up laundry at Knightswood Hospital, for the T.C. :—

*J. Ritchie, Glasgow	£5,331 19

GLASGOW.—Erection of electricity sub-station at Drumoyne, for the T.C. :—

*S. M. Stark	£1,170 1 3

GLASGOW.—Erection of electricity sub-station at Greenhead, for the T.C. :—

*R. Gilchrist & Son	£525 17 4

GLASGOW.—For painting work in connection with Greenhead housing scheme, for the T.C. :—

*A. Stirling & Son, Glasgow	£4,949 13

H.M. OFFICE OF WORKS.—August Contracts :—*Building Works, &c.*—Bethnal Green Museum, external painting: G. Groves & Son, London, N.; Chester-le-Street housing scheme, Perkinsville site, Pelton, slating: John Hewitson, Newcastle-on-Tyne; Chorlton-cum-Hardy Telephone Exchange, steelwork: Bannister, Walton & Co., Manchester; Coventry new Sorting Office, erection: Wm. Sapcote & Sons, Birmingham; East Ashford housing scheme, plastering: W. R. Southern, Dover; Hanley Employment Exchange, hutting: Thomas Godwin, Hanley; Hayes new Post Office, erection: W. G. Tarrant, Ltd., Byfleet; Hebburn housing scheme, slating: E. Parkinson, London, N.; Imperial College of Science, painting: Trollope & Colls, Ltd., London, S.W.; Ipswich new Sorting Office, erection: E. Catchpole & Sons, Ltd., Ipswich; Kew Gardens, Palm House, painting: Robersons, Ltd., London, S.W.; Kew Insurance Office, steelwork: Dorman, Long & Co., Ltd., London, S.W.; Leadgate housing scheme, slating: E. Parkinson, London, N. London District, ordinary works and repairs: Arthur Vigor, Ltd., London, S.W.; National Gallery, fireproofing: O. Kennard, London, S.E.; Pilton Hospital, Edinburgh, hutting: W. & J. R. Watson, Ltd., Edinburgh; Painters' work: P. & J. Gordon, Edinburgh; plumbers' work: P. Knox & Son, Edinburgh; Reading new Post Office, erection: Boshers (Cholsey), Ltd., Cholsey; Asphalte work: Permanite, Ltd., London, E.; Patent glazing: W. H. Heywood & Co., London, S.W.; Plumbing: Boyd & Murley, Ltd., Reading; Steelwork: Dorman, Long & Co., Ltd., London, S.W.; Stonework: A. F. Jones, Reading; Wrought iron work: J. A. Girdler, Reading. Retford new Post Office, erection: J. E. Johnson & Son, Ltd., Leicester; Rowley Regis housing scheme, slating

E. Wyle, Blackheath, near Birmingham; St. Albans Telephone Exchange, steelwork: Redpath, Brown & Co., Ltd., London, E.C.; Savings Bank, West Kensington, asphalting: The Seyssel & Metallic Lava Asphalte Co., London, E.C.; steelwork: Dorman, Long & Co., Ltd., London, S.W.; stonework: The Bath & Portland Stone Firms, Ltd., Bath; Southampton Telephone Exchange, alterations, &c.: Arding & Hobbs, Ltd., London, S.W.; steelwork: Dorman, Long & Co., Ltd., London, S.W.; Southwick-on-Weir housing scheme, slating: R. Dawson, Sunderland.

Engineering Services: British Museum, heating apparatus: Bilbie, Hobson & Co., London, E.C.; Dewsbury Telephone Exchange, heating apparatus: The Brightside Foundry & Engineering Co., Ltd., Sheffield; Harrogate new Sorting Office, heating apparatus: Thomas Obank & Sons, Bradford; Harrowby Camp, Grantham, heating, &c.: Thomas Danks & Co., Ltd., Nottingham; Kew Insurance Office, heating, &c.: The Thames Bank (Blackfriars) Iron Co., Ltd., London, S.E.

LONDON.—For making up Craven-walk and Leadale-road, for the Hackney B.C.:—

	Craven-walk.	Leadale-road.	Total.
*G. J. Anderson, Poplar—	£760 4 8	£2,647 10 7	£3,407 15 3
William Griffiths & Co., Ltd., E.C.2—	771 15 10	2,667 17 2	3,439 13 0
Do. Alternative tender—	764 19 10	2,641 18 2	3,406 18 0
W. Walkerdine, Ltd., Kensington—	843 19 1	2,950 0 0	3,793 19 1
Grounds & Newton, Tottenham—	870 5 6	2,975 11 8	3,845 17 2
Wm. Thompson, Luton—	£875 10 11	£3,026 13 0	£3,902 3 11
Howard Farrow, Golders Green—	880 16 0	3,014 9 3	3,895 5 3
Brown & Tawes, Ltd., E.C.2—	973 4 7	3,379 9 8	4,352 14 3
Mulville Bros., S.W.1—	1,262 5 6	4,286 16 2	5,549 1 8

NEWPORT (MON).—For the erection of 250 houses on the Somerton Estate, for the T.C. Mr. C. F. Ward, Borough Architect, Newport, Mon. Quantities by Borough Architect:—

*Unit Construction Co., Ltd., Birmingham—Averaging, approximately, £690 per house.

*The Ministry of Health has so far sanctioned the erection of 110 houses only.

PRESTON.—Extension of disinfecting station at St. Paul's-road Yard, for the T.C.:—

*Swarbrick & Gaunt £413 16 5

PRESTON.—For (*a*) heating work, and (*b*) furniture and fittings at Park School, for the T.C.:—

*(*a*) C. Seward & Co..... £165
*(*b*) J. Cartmell & Sons..... 265

ROTHWELL.—Erection of houses, for the U.D.C.:

*Dunhill Bros. ..24 houses, £604 18s. 4d. per house.
*Chapman Bros.. 6 houses, £609 per house.
(Subject to approval of Housing Commissioner.)

SMETHWICK.—Re-lining of the destructor furnaces, for the T.C.:—

*Meldrums, Ltd. £1,3

SMETHWICK.—Erection of additional offices of the "Speirsesque" pattern at rear of Council House, for the T.C.:—

*Speirs, Ltd., Glasgow £760

SMETHWICK.—External redecoration of Council house, for the T.C.:—

*Roden, Shermer & Jones..... £140

TYNEMOUTH.—For works in connection with enclosure of Market shed, for the T.C.:—

*Hastie, Burton—Gates £49 10 0
*S. R. Gledson & Son—Hanging gates..... 145 15 4
*Dorman & Long—Steel and iron-work 198 10 0

TYNEMOUTH.—For redwood creosoted fencing for West End Park, for the T.C.:—

*Albert Edward Dock Sawmills, Ltd...15s. 9d. per lineal yard.

WALLAND MARSH.—For making out the following sewers: (1) South part of White Kemp main sewer; (2) south part of White Kemp sewer, for the Commissioners. Mr. Charles Clark, Expenditor of the Waterings, Thrift Farm, Brookland, Kent:—

No. 1.

*George Cat, Lydd .....
F. Sisly, Lydd..... } £192 252

No. 2.

F. Sisly, Lydd..... 450

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